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COMPARISON OF THE BLOOD SEDIMENTATION RATE AND VERNES FLOCCULATION TEST IN PULMONARY TUBERCULOSIS.

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By arrangement with the University of Melbourne and under the control of Dr. J. Bell Ferguson, State Director of Tuberculosis, and Professor H. A. Woodruff, Director of the Department of Bacteriology, an investigation has proceeded during the past year into the comparative values of the blood sedimentation rate and the Vernes flocculation test in pulmonary tuberculosis. An attempt has been made to coordinate the results of the blood sedimentation test with that of the Vernes flocculation test in relationship to one another, both in regard to the question of diagnosis and as to the value of control of various forms of treatment.

The medical officers taking part in the investigation were Dr. Sara Gunderson, Bacteriology Department, University of Melbourne; Dr. Margaret Playle, Greenvale Sanatorium; Dr. Laura Weir, Janefield Sanatorium; Dr. Henry Watson, Heatherton Sanatorium; Dr. Brian Sergeant, Austin Hospital; and Dr. H. Maxwell James, Central Tuberculosis Bureau, Melbourne.

The compilation of the report and of the graphs was carried out by me.

Introductory.

Over a period of twelve months, observations have been made on 407 patients, 337 females and 78 males, either suspected of or suffering from pulmonary tuberculosis. In all, 886 specimens of blood were taken and submitted to the double test of estimation of the blood sedimentation rate (B.S.R.) and the Vernes flocculation method of investigation.[1]

[1] The technique of these tests is described in the appendix to this paper.

The Cutler one cubic centimetre technique was used for estimating the blood sedimentation rate, and the Vernes resorcin test was used for the flocculation experiment. The ages of the patients varied from sixteen to fifty-eight years. As far as possible, conditions were standardized, the blood for both tests being withdrawn at the one venipuncture, and the necessary conditions for correct reading of these results were maintained on each occasion.

Diagnosis.

It is not now claimed for either of these methods of investigation that they are specific in their action, but rather that they may be used in the control of patients as indicating progress. Their use in diagnosis is confined to supplementing other clinical information. False positive findings occur with both methods. An increased blood sedimentation rate occurs in malignant disease, infectious arthritis, cardiac disease of infective origin, some nervous diseases, and also in pathological conditions of the liver and gall-bladder, in addition to active tuberculosis. Any disease in which tissue destruction is taking place will cause an increased sedimentation rate. *Diabetes mellitus* and pregnancy also have the same effect.

In the Vernes flocculation test positive reactions occur in acute specific fevers in general. During this investigation certain other factors have suggested themselves as giving a positive reaction in the Vernes test and will be discussed later.

The difficulties of differential diagnosis have been emphasized in these tests not only by the appearance of false positive results, but even by a certain percentage of what might be called false "negatives". In nine cases of this series all the stigmata of active pulmonary tuberculosis were present with normal readings for both blood sedimentation rate estimations and the Vernes test, that is, the nine patients all had tubercle bacilli in the sputum with X ray findings of undoubted pathological significance accompanied by systemic disturbances. Taking both the blood sedimentation rate and the result of the Vernes test as of prognostic rather than of diagnostic value, it was, however, seen that these figures were not anomalous. None of the nine patients showed any evidence of breaking down or of tissue destruction, and the infections were of the productive rather than of the exudative type. All of these patients have made good progress up to date, and at the present moment have clinically arrested inactive disease. These cases, however, do stress the point that neither test is of accurate value in the diagnosis of early pulmonary tuberculosis.

As it has been claimed for both these methods of investigation that a measure of the activity of disease may be ascertained, as the study proceeded it was thought better to confine the research to cases already diagnosed as pulmonary tuberculosis and to endeavour to ascertain whether the end-results of both methods of investigation were comparable in any way. As the end figure in both tests is given a numerical value, it was thought that they should bear a definite relationship one to another, provided all other factors were equal. It is on these lines that the investigation has proceeded, blood being withdrawn for test every two months under identical conditions.

Patients Under Treatment.

At the beginning of this investigation it was thought that it might be possible to strike a constant ratio between the blood sedimentation rate and the Vernes figures, irrespective of the actual cases. Blood sedimentation index is normal for men up to 7, for women up to 10; moderate activity is shown by an index up to about 15, and a more active lesion with an index up to a maximum of about 35. The Vernes figures are normal to about 15; moderate activity is shown by figures to 50, and maximum activity from 50 to about 180. The ratio in the nearer normal groups of figures should be about 1 to 3, but the considerable range of the higher Vernes figures in the more active cases makes it difficult to strike a constant ratio at this end of the scale. On plotting out figures irrespective of cases, we found this emphasized. The lower figures for both blood sedimentation rate and the Vernes test maintained a fairly constant relationship to each other, but immediately the higher figures were reached the Vernes figure began to swing excessively on either side of the blood sedimentation rate graph. It was determined then that the figures must be studied on individual cases and not as a whole. From the latter studies it was deduced that in individual cases under identical conditions there is maintained a fairly constant ratio between the end figures for each test (Figures I and II).

For the purposes of this paper this relationship will be referred to as the case ratio. And this is constant only where conditions are unaltered. A change of treatment may produce an entirely different case ratio. That is to say, for instance, that where a fairly constant ratio has been maintained whilst a patient is having gold treatment, an entirely new ratio may occur and may remain constant at the new ratio when the patient is transferred from gold to, say, tuberculin. The case ratio is subject to minor variations, which will be discussed.

Of the 407 patients under investigation for various reasons it became necessary to discard 142 after taking only one blood test, leaving 265 for the more complete investigation. The defection of the 142 was due to many causes; some died shortly after the first test, and some refused to give further samples of blood, or left the sanatorium against advice. When we consider that each test involved a fast of about fifteen hours and the withdrawal of about 11 cubic centimetres of blood, it is perhaps more surprising that 265 remained faithful. Temperament and unreliability were other reasons for the exclusion of certain patients from the complete course of tests.

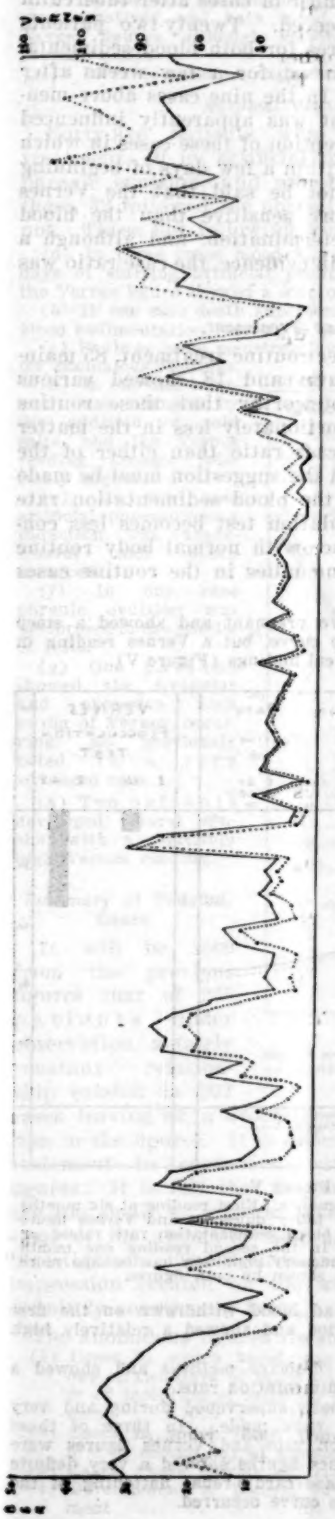

FIGURE I.

Composite graph from 52 cases in which the blood sedimentation and Vernes readings maintained a fairly constant relation. These represent cases from Greenvale Sanatorium. Cases have been grouped together for corresponding case ratios.

Details of Treatment.

Gold Treatment.

Twenty-three patients were under treatment with "Solganal B" and 20 with intravenously administered gold chloride. Of the former, the case ratio was well maintained in 17 and not so well in 6. Of the latter, the figures followed well in 17, but not so well in 3. Of the whole of the patients on gold it might be said that of 43 cases the relationship was constant and maintained in 34 and showed various aberrations in 9. The aberrations may be classified as follows:

(*a*) In three cases in which the Vernes figures were proportionately much higher, it was found that blood had been withdrawn either one or two days after injection of gold.

(*b*) In three cases with a relatively much higher Vernes reading blood had been withdrawn on the first day of a menstrual period.

(*c*) In one case it was found that a change of treatment had been made from "Solganal" to tuberculin during the course of tests, altering the case ratio.

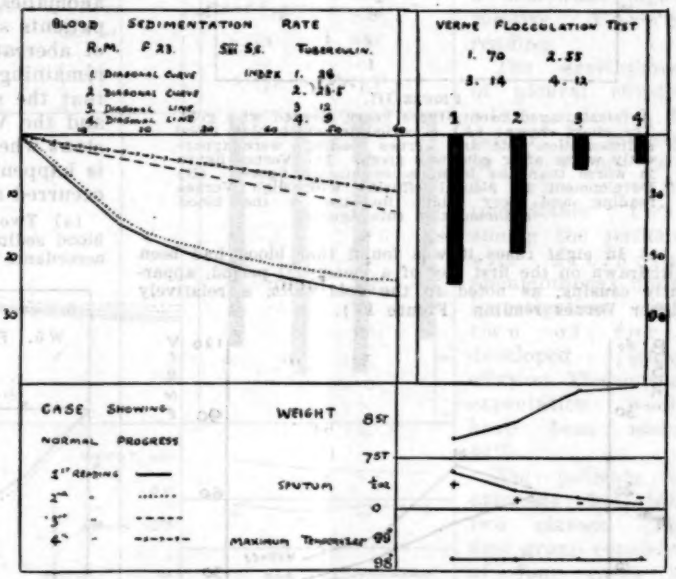

FIGURE II.

This case shows normal progress with blood sedimentation rate and Vernes readings corresponding. Clinical features, weight, temperature and sputum are also in accord with the blood readings.

(*d*) In two cases pleural effusion developed during treatment. In both cases an immediate increase in both blood sedimentation rate and the Vernes figures was noted, but the Vernes increase was relatively higher (Figure III).

An attempt was made to determine whether, after the administration of gold salts, a temporary period of depression occurred, that is, whether there was a reactionary period in which the blood sedimentation rate and the Vernes figures showed no improvement or became worse. In 14 of the 43 cases this was found to take place, and both the blood sedimentation rate and the Vernes figures were temporarily worse, improving again on the third test. The Vernes figures showed this more markedly than the blood sedimentation rate, as in addition three cases showed a Vernes increase where none was noted in the blood sedimentation rate.

Tuberculin Treatment.

Seventy-four patients under observation were being treated with tuberculin. Of these the case ratio was constant in 51, but

various anomalies were noted in 23. These were classified as follows:

(a) In nine cases it was found that blood was withdrawn within a few days of commencing the course of tuberculin treatment. In these the Vernes figure was relatively high.

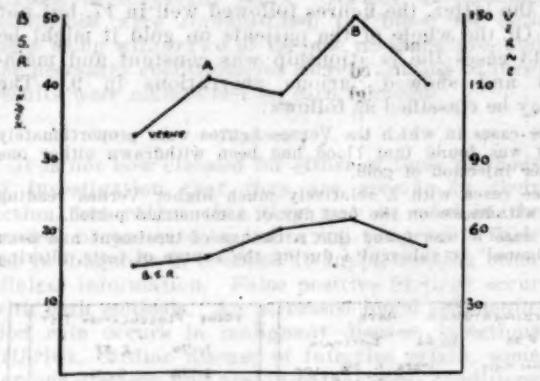

FIGURE III.

A female, aged twenty-three years, treated with gold. The chart shows: (A) a period in which both blood sedimentation rate and Vernes readings were apparently worse after gold was given. The Vernes figure is worse than the blood sedimentation figure. (B) Development of pleural effusion with high Vernes reading and very slight increase in the blood sedimentation rate figures.

(b) In eight cases it was found that blood had been withdrawn on the first day of a menstrual period, apparently causing, as noted in the gold salts, a relatively higher Vernes reading (Figure IV).

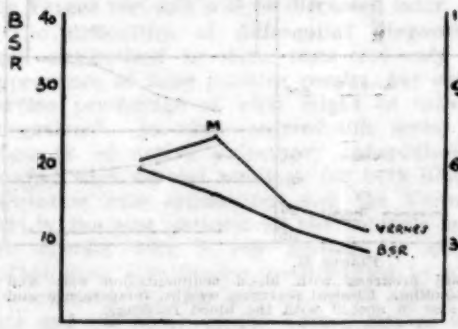

FIGURE IV.

L.S., a female, aged twenty-three years, treated with tuberculin, progressing well. The graph shows apparent effect on the Vernes reading of taking blood on the first day of the menstrual period.

(c) In one case it was noted that blood for the blood sedimentation rate estimation and the Vernes test had been taken separately at an interval of one week.

(d) In one case a change was made from tuberculin to gold in the middle of the test, altering the case ratio.

(e) Two patients died very shortly after the tests were completed and these cases showed a definite flattening of the blood sedimentation rate curve, noted by previous writers as occurring shortly before death where associated cardio-renal disease was present. In this case the Vernes figures remained unaltered.

(f) In one case a genito-urinary infection occurred—pyelitis—and a strongly marked Vernes rise became evident.

(g) In one case no explanation could be given.

As with gold salts, it was determined that an apparently refractory period existed for a few weeks in a certain number of cases after tuberculin treatment was commenced. Twenty-two patients showed increased figures for both blood sedimentation rate and Vernes test for a few weeks after beginning treatment. In the nine cases above mentioned the Vernes test was apparently influenced more, but with the exception of these cases in which the tests were made within a few days of beginning treatment, it could not be said that the Vernes reaction was any more sensitive than the blood sedimentation rate determination, and although a refractory period was in evidence, the case ratio was largely maintained.

Routine Treatment.

Of 103 patients under routine treatment, 85 maintained a constant ratio and 18 showed various anomalies. It is noteworthy that these routine patients showed proportionately less in the matter of aberrations from case ratio than either of the remaining groups, and the suggestion must be made that the stability of the blood sedimentation rate and the Vernes flocculation test becomes less constant when interference with normal body routine is happening. The anomalies in the routine cases occurred as follows:

(a) Two patients were pregnant and showed a steep blood sedimentation rate curve, but a Vernes reading in accordance with the clinical findings (Figure V).

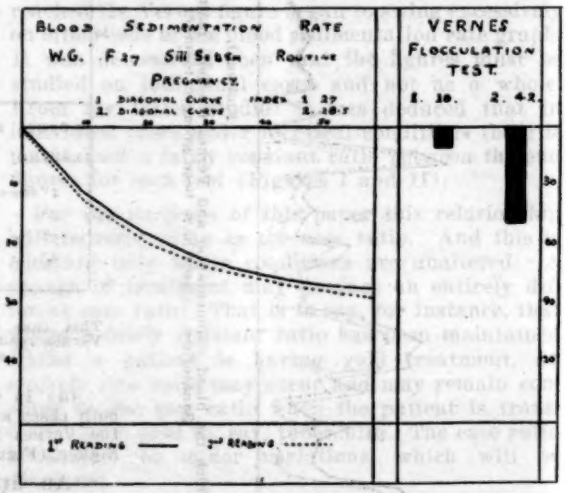

FIGURE V.

Showing the effect of pregnancy. First reading at six months pregnancy. Tuberculosis fairly quiescent and Vernes figure with normal limits, but blood sedimentation rate raised on account of pregnancy. In the second reading one month after parturition the pulmonary condition has become more active and is shown by both figures.

(b) Seven patients had blood withdrawn on the first day of a menstrual period and showed a relatively high Vernes figure.

(c) One patient had *diabetes mellitus* and showed a relatively high blood sedimentation rate.

(d) In four cases death supervened during and very shortly after the tests were made. In three of these both blood sedimentation rate and Vernes figures were very high, and the Vernes figures showed a very definite irregularity. In one case cardio-renal flattening of the blood sedimentation rate curve occurred.

(*e*) In one case the diagnosis of pulmonary tuberculosis was negatived and both blood sedimentation rate and Vernes figures, although varying slightly, were within normal limits.

(*f*) In three cases no explanation could be given.

Surgical Treatment.

Forty-five patients were undergoing surgical treatment, 40 by artificial pneumothorax, four by phrenic evulsion, and one by thoracoplasty. Of these, 32 followed the normal case ratio and 13 did not. Those not following were classified:

(*a*) In three cases blood was withdrawn within three days of starting artificial pneumothorax treatment, and the Vernes figure showed a disproportionate rise.

(*b*) In one case death supervened, with flattening of the blood sedimentation rate curve from cardio-renal disease.

(*c*) In three cases menstruation was apparently a reason for anomalous readings.

(*d*) In one case treatment was changed by the addition of gold salts, and the Vernes reading became relatively higher.

(*e*) In one case artificial pneumothorax induction was unsuccessful and death occurred.

(*f*) In one case phrenic evulsion was performed in the middle of tests.

(*g*) One patient showed the irregular and excessive high swing of Vernes, occurring, as previously noted, in a very advanced case.

(*h*) Two patients developed pleural effusion with a relatively high Vernes reading.

Summary of Treated Cases.

It will be seen from the previous figures that of 265 patients under observation, a fairly constant relationship existed in 202 cases, leaving 63 in which there was apparent variation in the figures. It is difficult to make a definite statement in connexion with these anomalous figures. It is felt that the numbers in themselves are too small to warrant definite conclusions, and some of the anomalies at least are worth further investigation. The figures are given, then, for the impression created on the writer rather than as definitely constituted facts.

The anomalous figures are summarized as follows:

(1) Cases in which blood was withdrawn within one or two days of injection of foreign material or of inception of artificial pneumothorax treatment	15
(2) Cases in which blood was withdrawn on the first or second day of a menstrual period	21
(3) Cases where change of treatment occurred	4
(4) Development of pleural effusion during treatment	4
(5) Cases extremely ill and near death	9
(6) Pregnancy	3
(7) Doubtful	4
(8) Miscellaneous—(*a*) blood sedimentation rate estimation and Vernes test made at different times, (*b*) secondary infections, (*c*) concurrent diabetes, (*d*) not tuberculous	4

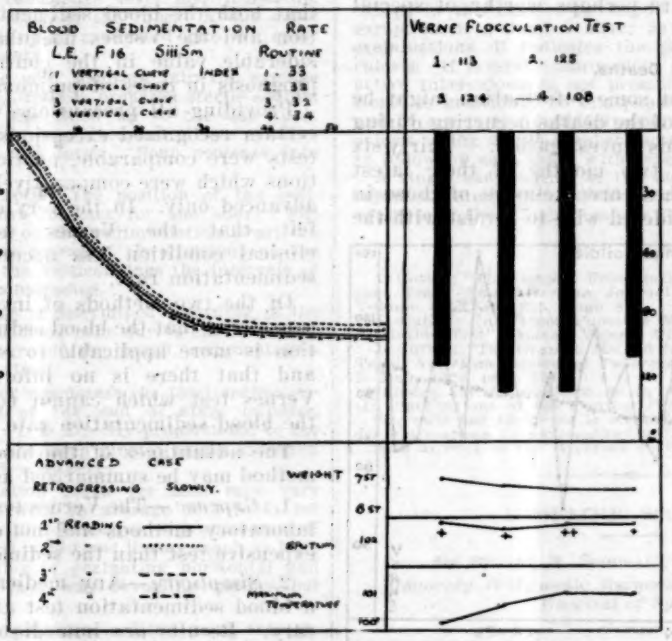

FIGURE VI.

Shows irregularity of the Vernes reading in a very advanced case of phthisis as contrasted with comparative stability of the blood sedimentation rate.

Those cases in which treatment had just been instituted showed a much higher relative Vernes reading. The higher Vernes reading also appeared to occur during the first two days of menstruation. Unfortunately it has not been possible to obtain a check of menstrual readings in apparently healthy females.

Where change of treatment occurred, the impression was gathered that the administration of gold salts produced a somewhat higher relative Vernes reading.

The development of pleural effusion also appeared to favour an increase in the Vernes rate. It was rather remarkable that among the patients with artificial pneumothorax under investigation, only two of forty developed pleural effusion. The normal expectation would have been about 40%.

The patients *in extremis* fell into two classes. The first group consisted of four cases in which associated cardio-renal changes were present and in which a marked flattening of the blood sedimentation rate curve occurred with a falling of the sedimentation index shortly before death. In this group the Vernes figure also became less, but not to so great an extent as the sedimentation index. In the second group of five patients, more or less *in extremis*, the readings from both groups of figures remained very high, but that for the blood sedimentation rate was much more stable than that of the Vernes test. The impression gathered was that the Vernes figures, when high, were subject to considerable variation, a difference of 20 to 30 on subsequent readings being common.

In pregnancy the blood sedimentation rate figure appears to be increased whilst the Vernes result shows little change.

In concurrent diabetes the blood sedimentation shows a steep rate independently of the condition

of activity of pulmonary disease. In the one case in this series the Vernes figure did not appear to be increased at all. The suggestion is that diabetes may influence the blood sedimentation rate, but not the Vernes.

In the case in which secondary genito-urinary infection occurred, the blood sedimentation rate was apparently unaltered, but the Vernes figures showed a definite rise. This is somewhat confirmatory of the previous claim that a false Vernes positive may occur in acute infections.

However, it is particularly stressed that as the purpose of this paper was more the establishment of a relationship between the blood sedimentation rate and the results of the Vernes test, if possible, these remarks as to anomalies are thrown out more as suggestions and are perhaps worthy of special investigation.

Deaths.

It was thought that some information might be gleaned from a study of the deaths occurring during and shortly after this investigation. Thirty-six patients died within two months of their latest tests being made. These are exclusive of those in which it was not considered wise to persist with the

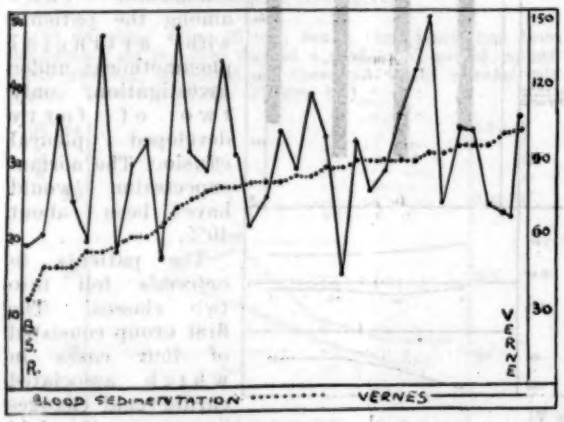

FIGURE VII.

The graph represents the last reading of the blood sedimentation rate and the Vernes test in 36 patients dying. Tests were taken within two months of death. The blood sedimentation rate is fairly constant; the Vernes readings are irregular.

test on account of the advanced nature of the disease. In twenty-six of these the most recent blood sedimentation index was from 25 to 30. There were four of cardio-renal disease in which the final indices had fallen to 12, 16, 16 and 18 respectively. The remaining five were between 19 and 24.

Excluding the cases of cardio-renal disease, it might be said that 82% of the blood sedimentation rate readings were constantly high shortly before death.

The corresponding Vernes figures showed an almost uniformly distributed arrangement of between 45 and 148. The impression gathered is that with the Vernes test anything over 50 indicates a very severe degree of activity. Also that at this stage the blood sedimentation rate is somewhat more constant (Figures VI, VII).

Syphilis.

A concurrent Wassermann test was taken in all cases and it is perhaps remarkable that only three positive tests were found, that is, less than 0·9%. All three cases gave high readings for both tests. One patient only was treated, the other two being referred to separate clinics. The treated patient showed a reasonably constant case ratio and also evidenced a short period of reaction after commencing injections in which the Vernes figure rose, but not that of the blood sedimentation rate.

Conclusion.

The work of previous writers was confirmed in that both the blood sedimentation rate determination and the Vernes flocculation test are of considerable value in the control of treatment and prognosis in cases of pulmonary tuberculosis.

Providing all precautions were taken, and with certain recognized exceptions, the figures for both tests were comparable, particularly in those infections which were comparatively early or moderately advanced only. In the very advanced cases it was felt that the Vernes test represented the clinical condition less accurately than the blood sedimentation rate.

Of the two methods of investigation, it must be considered that the blood sedimentation rate estimation is more applicable to everyday clinical work and that there is no information given by the Vernes test which cannot equally be supplied by the blood sedimentation rate.

The advantages of the blood sedimentation rate method may be summarized as follows:

1. *Expense.*—The Vernes test, because of elaborate laboratory methods and material, is a much more expensive test than the sedimentation test.

2. *Simplicity.*—Any medical practitioner can do a blood sedimentation test at the bedside if necessary. Results are immediate and no calculations are necessary. With the Vernes test a certain amount of calculation is necessary, the human element becoming a factor to be considered.

3. *Information.*—The blood sedimentation rate actually gives considerably more information than the Vernest test. In the Vernes test we have an end figure only. With blood sedimentation the rate of fall of the erythrocytes is plotted every five minutes and there is nothing in the Vernes test to correspond to the information received from a study of the curve. The difference between a diagonal and a vertical curve in the sedimentation test is often of paramount importance.

4. *Comfort.*—The one cubic centimetre technique for the blood sedimentation is a very simple matter for the patient and occasions practically no discomfort. For the Vernes test it is necessary to withdraw at least ten cubic centimetres of blood. For the Vernes test also a fast of about fifteen hours is necessary before the test is made.

5. *Transport.*—Blood for the Vernes test must be sent to a centre where there are the requisite facilities. The blood sedimentation test may be performed anywhere.

In all we feel that the blood sedimentation test is of equal value to the Vernes and is not subject to the same number of fallacies.

Because of its ease of application and greater information supplied, it must be preferred to the more complicated Vernes test.

Appendix.

Cutler's One Cubic Centimetre Technique for Blood Sedimentation.

The sedimentation tube has an internal diameter of five millimetres and is marked in millimetres beginning with zero at the one cubic centimetre level and increasing downwards to 50 at the base of the tube. A one cubic centimetre hypodermic syringe, graduated into 0·1 cubic centimetres, is also necessary.

Before puncture of the vein, aspirate into the syringe 0·1 cubic centimetre of 3% freshly prepared sterile sodium citrate solution. Draw the blood up to the one cubic centimetre mark and gently mix blood and citrate solution by tilting syringe back and forth. Pour contents into sedimentation tube.

The test is read by noting the position of the sedimenting column every five minutes for one hour. The observations are recorded on the sedimentation chart, on which the horizontal lines represent the divisions on the sedimentation tube, and the vertical lines the intervals of time. A graph is then constructed.

The sedimentation value is determined according to the path traversed by the red blood cells during the first hour and depends on the nature of the graph, sedimentation index and sedimentation time.

The sedimentation index represents the total sedimentation of red blood cells at the end of sixty minutes, expressed in millimetres. It is directly proportional to the severity of the infection, becoming greater as the infection becomes more active and *vice versa*.

The normal sedimentation index for men may vary from 2 to 8 millimetres, with an average of 3 to 4; for healthy women, from 2 to 10 millimetres, with an average of 5 to 6. Under pathological conditions it may reach as high as 35. Its real value lies in evaluating horizontal and diagonal lines, and in that way revealing hidden but important information.

The sedimentation time requires a little more explanation. In the horizontal and diagonal type of curve, sedimentation is not completed within the sixty minutes, but in the diagonal curve and the vertical drop the erythrocytes may be closely packed before the hour is completed and practically no further fall is noted. For the purpose of the test it is noted at what period of time the settling of the erythrocytes is one millimetre or less. This time is known as the sedimentation time. If the time is from thirty-five to sixty minutes, the graph is a diagonal curve; if less than thirty minutes, it is a vertical curve.

In healthy persons and in tuberculous patients in whom the disease has become absolutely quiescent, the graph is normal, that is, it is a horizontal line.

In tuberculous persons in whom the disease is not absolutely quiescent, but who do not have sufficient pathological activity to develop constitutional symptoms, the graph is usually a diagonal line, but with a variable sedimentation index which is directly proportional to the degree of pathological activity.

In tuberculous persons in whom the pathological activity is such that constitutional symptoms develop, the graph is usually a diagonal or vertical curve, but with a variable sedimentation time which is inversely proportional to the severity of the infection.

The Vernes Test.

The Vernes test for tuberculosis is a flocculation test. The flocculation is produced by adding an equal part of a 1·25% solution of resorcin to the serum, and the amount of flocculation is recorded by a number read on a photometer.

It is essential that the serum be perfectly clear, and therefore the blood (ten cubic centimetres) must be taken with the patient fasting for at least fifteen hours. Also the test must be made not later than the day after the blood is taken.

All sera produce some flocculation. For a normal serum the flocculation is slight, and the number is usually below 15, and always below 30. The serum of a tuberculous person produces greater flocculation and the photometric number may be very high, up to 150, or occasionally even higher.

A number above 30, with rare exceptions, indicates the presence of active tuberculosis. These exceptions are found in cancerous cachexia and some febrile infections, as typhoid fever. These high figures are only temporary, except in the case of cancerous cachexia, and with this exception, if a number above 30 is obtained on repeated examinations, it indicates the presence of active tuberculosis. If several examinations give a number below 15, active tuberculosis is not present (with very rare exceptions, as mentioned in this paper). Numbers between 15 and 30 are in the doubtful zone, the probability of tuberculosis rising as the number increases, and it is necessary to follow up such cases with repeated examinations.

A single examination of the blood is not sufficient, and repeated examinations should always be made, so that the progress of the infection can be followed on a graph.

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IDIOPATHIC SCOLIOSIS.[1]

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THE term scoliosis is as old as the history of medicine itself, unaltered from the Greek word applied to the condition by Hippocrates, who thought the condition a dislocation, a conception that was held for the next two thousand years. Drastic efforts at reduction were made in those early times, and in treatment during the following centuries little attention was paid to retention. Leverage with great force was used. It was about two centuries ago that doubt was thrown on the theory of dislocation. Scoliosis is of additional interest to the orthopædic surgeon in that among the writers about this time was André, the inventor of the term "orthopædic". About forty years later Percival Pott separated spinal tuberculosis from the list of unclassified curvatures. The century following André saw a bewildering array of retentive

[1] Read at a meeting of the Section of Orthopædics of the New South Wales Branch of the British Medical Association on May 19, 1933.

apparatus in almost infinite complication, and little mention was yet made of gymnastics. From the middle of the nineteenth century knowledge of the ætiology began to increase and from then on gymnastics have more and more taken a place with mechanical treatment. The end of the nineteenth century saw an era of forcible correction in apparatus, with the application of fixed plaster of Paris jackets. Types of congenital scoliosis were soon recognized, chiefly through Böhm, and the latter was among those who stressed the probability of inherent bone defect, leading to the present conception.

Scoliosis is defined by Lovett as a condition in which any series of vertebral spinous processes shows constant deviation from the median line of the body, always accompanied by an element of twisting. A classification follows into postural and structural scoliosis, which provides a sharp dividing line between mobility and fixation, for lateral curvature is in general a progressive affection. The postural type is limited to those curves which disappear on suspension or in recumbency. This is essentially the physiological curve necessitated in a normal spinal movement laterally when the lower limbs are made unequal by a block under the foot. In the structural type there is organic change in the vertebra. It was not within physiological limits, and we have fixation.

Ætiology.

The same author gives, in the ætiology of scoliosis, an extensive list which includes in its main divisions congenital lesions, asymmetries outside the spine, pathological affections of vertebræ and of bones and joints of the lower limbs, distorting conditions due to disease of the soft parts and, finally, habit or occupation. But there is no use of the term "habitual scoliosis", or "idiopathic scoliosis". Schulthess, quoted by Steindler in a full classification, gives, among the causes in his second division, habitual scoliosis along with constitutional debility or insufficiency, but the term "idiopathic scoliosis" is not used. Steindler uses the terms "idiopathic" and "habitual" as synonymous, to indicate a given type of scoliosis, but prefers the term "habitual" as more appropriate. Here he uses these terms to denote that type in which habit is an additional factor to some unknown cause. Where Lovett discusses the curvature due to habit and occupation, he does so in its effect on the normal spine. Now, essentially the word "idiopathic" indicates the absence of a definite underlying cause. So that there would seem to be some need for clarity in the use of terms, and it becomes necessary to define the sense in which they are used in these subsequent remarks. Habitual scoliosis will be taken as applicable only to curvature caused by occupation or habit in a normal spine, as demonstrated by Arbuthnot Lane in such types as the hod carrier. Idiopathic scoliosis will apply to the type of indefinite causation, where habit or other factors would merely determine the topography of the curve. Postural scoliosis and structural scoliosis remain as the two divisions of all scoliosis according to mobility or fixation.

In using the term idiopathic, we recognize the desirability of displacing the term when the basic condition is established. The recognition of the latter would fill the gap remaining in the ætiology of scoliosis. But the gap is a large one in a multiple and diverse ætiology. Steindler gives the proportion, in a series of seven hundred cases, as 48% of all scoliosis and the bulk of these are idiopathic in the limited sense defined earlier. So that our knowledge of the causation is not so complete as it may seem from our lists of thirty or more established causes, capable of extension, when we lack finality in regard to a group comprising nearly half of our scoliotics.

Scoliosis would appear to be rare among animals and still more rare apart from domestic animals. Fœtal malformations in the new-born horse, goat, deer and calf are recorded, rhachitic curvatures in pigs and congenital vertebral defects in the horse. Neither habitual nor idiopathic scoliosis has been demonstrated as occurring naturally in the quadruped. In the fish and the snake vertebral anomalies appear as the sole cause. But with the domestic hen, duck and goose, collectively taken as fowl, scoliosis is not rare and here we have a stance approaching upright, together with domestic feeding. In a series of twelve such curves in the fowl Härtel found two distinct types. The first was an atypical scoliosis, only numbering two in the series, due to such vertebral defects as hemi-vertebræ. But the second was a typical scoliosis with similar rotation to that found in our common adolescent type and these constituted ten out of the twelve. In these, trauma, inflammatory processes and gross rickets were excluded. The examination of this latter type, and its comparison with idiopathic scoliosis, may furnish some analogy and will be referred to later. The Museum authorities in Sydney can furnish no information of the occurrence of scoliosis in the marsupial, some of which by their upright stance should furnish suitable material for work.

Without separate figures for the frequency of idiopathic scoliosis, some indication may be gained from general investigation, bearing in mind the percentage found in Steindler's series. From a summary of carefully compiled works the frequency in school age in girls varies from 10% to 23% and in boys from 16% to 26%, giving a comparatively even distribution between the sexes at this time of life, with a slightly major incidence in the male. But wider variation in figures in adjacent localities has been recorded by the same workers. In orthopædic institutions a much greater percentage of girls applies for treatment than boys. The effect of scoliosis on the figure and clothing of girls is more readily perceptible in the early stage, and this is one reason for the comparative numbers seeking treatment. There does not appear to be a definite figure for comparison in adult life.

It is not easy to fix a definite time of onset for individual cases, but apart from such obvious scoliosis as due to rickets, anterior poliomyelitis

and congenital defects, which occur mostly before five years, the majority, which includes the large idiopathic group, are mostly brought for treatment between seven and ten years. Since we are dealing with idiopathic scoliosis, and not scoliosis in general, I take it that our discussion should be directed to its distinction, ætiology, specific factors and treatment, and I, therefore, propose to omit, as not germane to our object, any description of the anatomy and movement of the spine, the mechanism of scoliosis, methods of examination and progressive recording, the symptoms and the gross pathology.

As regards topography, any degree and any type of scoliosis may be found in idiopathic scoliosis, but more common, according to Steindler, is the total left and the combined right dorsal. For any underlying causation we have to consider, in the main, the skeletal aspect, the soft parts maintaining posture and indirect factors.

For a long period it was held that school life with its habitual postures was sufficient to account for the large group of scoliosis under discussion without the assumption of a further underlying cause, but at the German Orthopædic Congress in 1910 the majority who participated in a discussion of this aspect, were of the opinion that a postural scoliosis might result, but that it could not be accepted as a routine cause of severe scoliosis, such as is seen in this group. Lovett reaches the same conclusion. Experimentally, constant, long continued attitude in a spine produces a scoliosis that is structural. The habitual postures of school life as regards a normal spine are probably only capable, in general, of producing a postural curvature if they produce any effect at all. Such a curvature would be mild and not progressive in a spine otherwise normal, and would seem to differ only in its passive factor from the more active compensatory equilibrium necessitated in the hod carrier. In association with school life, Jones and Lovett discuss the factors of bad air, lack of hygiene and insanitary surroundings in their influence on general health and bad attitudes. In the relative importance of these factors time may show our ideas to be in need of strong modification. Though perhaps not entirely analogous, it is interesting to examine the Carnegie report on the physical welfare of mothers and children in Scotland and concerning the inhabitants of the island of Lewis in the Hebrides which is summarized by Mellanby as follows in his Hasting's lecture, 1931:

> Many of the inhabitants of these islands live in what are called "black houses". These are constructed of turf and stones and have a thatched roof. There is often no chimney to the house, and, since the peat fires are kept constantly burning, and there is no exit for smoke except through the door, the condition of the atmosphere of the house can be well imagined. The walls are often as much as five feet thick. Cattle frequently live under the same roof, the byre adjoining the house, and it is sometimes necessary to pass through the byre to enter or leave the building. Chickens have full run of the house and go on to the beds, table and dressers. Altogether, the hygienic conditions are dreadful. What about the children? The statements are made in the report: "the children are not taken out until they can walk"; "never taken out until they can walk, except possibly for a few minutes on a fine day in the summer time". It is quite clear, therefore, that if bad hygienic conditions and lack of exercise are responsible for rickets and ill-health, then the infants of Lewis ought to succumb at a great rate. What are the facts? The main fact is that the death rate of these infants under one year is about the lowest in the British Isles, even compared with the present rate, and has occasionally fallen to as low a figure as 40 per 1,000. This death rate compares very favourably with the infantile mortality of 100 to 300 per 1,000 usually found in the towns of this country at that time, in spite of the efforts made to improve the general hygiene. It is remarked that rickets is almost unknown in the island, and "the most striking fact in the adult population is their beautiful teeth—a testimony to the absence of rickets in infancy".
>
> If we now examine the diet of these people, we find results in close agreement with present expectations and knowledge. In the first place, practically all the children are breast-fed. Again, an analysis of the foods eaten shows that the staple articles of diet are fish, oatmeal and eggs. It is true that milk is scarce, except in summer; but against this we have breast-feeding, affording the opportunity to children to get milk at the most important period of their lives. As regards fish, we find that the liver of fish—that is, the best source of the antirachitic and anti-infective accessory factors—is regarded as the favourite dish. It is described as being mixed with oatmeal and milk and cooked in cod's head. It is almost certain that the breast-feeding of the children, together with the high content of fat-soluble vitamins of the adult diet, is responsible for the absence of rickets, the formation of beautiful teeth, and the very low infant mortality found in these islands, and that this is the case in spite of the dreadful hygienic condition of many of the houses.

These factors of bad air, poor hygiene and insanitary surroundings, undesirable as they are, probably play a relatively less important part than is customarily allotted to them. The good tooth and bone formation in this environment is notable, and the report brings into prominence the dietetic factor involved. The inference of these relative values is consistent with the conception of Engelmann.

As regards the skeletal aspect, the radiological work of Engelmann suggested a new orientation and foreshadows the disappearance of the term "idiopathic" with the accumulation of further knowledge. Lovett has stated that scoliosis is the result of mechanical forces acting on the spine which, in other than slight cases, must be assumed for some reason to be abnormally formed or possessed of less than normal resistance. Often no evident cause can be found and one is obliged to assume that the bones of the individual possess less than the normal resistance to weight bearing.

The occurrence of fixed bony changes in some cases and the persistence of mobile postural curves in others may be explained by assuming a plasticity of the bones of some persons not existing in others. While the theory of vertebral insufficiency was held, little was known of specific causes.

Schede defines prescoliotic attitudes in the total kyphosis and the round-hollowback, which he terms obligatory attitudes; from this he postulates the development of all idiopathic scoliosis. Engelmann's investigations show that almost all spines with rigid kyphosis in the dorso-lumbar region show some degree of scoliosis. Schede regards rickets as the basis of his prescoliotic attitudes. According to Jansen, there are three types of response to rickets

which correspond to periods of rapid growth: (i) Second year, typical rickets; (ii) three to five years, *genu valgum*, poor muscles and rapid epiphyseal growth; (iii) adolescence, poor skeletal resistance. There would be a fourth response in the adult as osteomalacia, which according to the recent monograph of the Medical Research Council ("Vitamins: A Survey of Present Knowledge") is, in the main, analogous to rickets. This formulates a varying response at four different growth-periods with deficiency of vitamin *D* as the chief factor involved.

The radiological work of Engelmann enunciates two types of rickets, one with the chief incidence epiphyseal and the other diffuse or malacic. The malacic type results in the severe rhachitic scoliosis in young children and the epiphyseal type is held to produce, in the rapid growth period of adolescence, the idiopathic type. Between the frank rickets of young children and the juvenile osteomalacia of puberty, transitional forms occur. Schorml has found that rhachitic changes in the rib cartilages may occur in adult life and, following the Great War, he reported an enormous increase of infantile as well as late rickets, reaching as high as 4% of the population.

As regards muscle insufficiency, this factor is conspicuous in both rickets and osteomalacia. But it would seem surprising how often a good physique accompanies what is presumably idiopathic scoliosis. But in these cases the diagnosis of the type of scoliosis may be in doubt.

McCarrison, in a lecture to the Royal College of Surgeons, 1931, gives an extensive list of surgical diseases, produced with common dietaries in rats, under hygienic and comfortable conditions and with some exposure to sunlight. Among the lesions produced he described crooked spines and distorted vertebræ. But no details are given as to the type of scoliosis. The converse was somewhat illuminating, in that scientifically fed rats with the same cleanliness and comfort incurred neither illness, infantile mortality, nor death over a period corresponding in man to forty or fifty years.

The Medical Reasearch Council monograph has stressed the responsibility of the accessory food factors for the production and maintenance of optimal growth. It is further to be noted that, according to Mellanby, the importance of such factors is in inverse relation to the age and is of outstanding value in the prenatal period. According to the same authority, so great would the antenatal value be, that damage is not marked in the next generation, in spite of substantial regard of optimal dietary, where the antenatal value has been high.

I would recall that the occurrence of what is probably idiopathic scoliosis is greatest in domestic animals in the fowl and, except in the skilled poultry farm, food deficiency would be very probable here.

Hansman, in a summary to his paper on vitamin *D* and the parathyreoid glands in the practice of medicine, 1932, says:

> In conclusion I would stress that in spite of a very large amount of research work, our knowledge of the physiology and pathology of calcium and phosphorus metabolism is still very incomplete. However, on the physiological side, we know enough to be able to protect the woman during puerperium and lactation and to ensure for her child a normally calcified skeleton and good dentition. On the pathological side, we are able to cure diseases such as rickets and osteo-malacia and we are beginning to understand the profound changes in calcium and phosphorus metabolism that disease of the endocrine glands can cause.

In its bearing indirectly on the associated problems, Hunter and Turnbull in a discussion on hyperparathyreoidism (*The British Journal of Surgery*, Volume XIX, Number 74) present the evidence indicating that generalized *osteitis fibrosa* is a disease of endocrine origin, whereas no evidence was found of hyperparathyreoidism in focal *osteitis fibrosa*. They go on to state:

> Finally a case of osteomalacia is recorded. Here the blood chemistry, metabolism and histology show that osteomalacia and generalized osteitis fibrosa are unrelated diseases.

Another factor put forward as an underlying cause has been suggested in the normal slight physiological curvature of the spine, and in connexion therewith righthandedness, the relation of the aorta and the asymmetry of the diaphragm have been brought forward, but it would seem improbable that these are a potent factor in a normal spine.

I can find no evidence of any direct association between idiopathic scoliosis and so-called static defects elsewhere, which are held in some quarters to have rickets as a fundamental basis. I was unable to find figures giving the association with *genu valgum* or *pes plano-valgus*. Nor would there seem sufficient evidence of association with any given anatomic or endocrine type. While the condition is by no means confined to weaklings, my impression is that they are below average physique, though it is thought in general that the slender anatomic type or carnivorous type is more subject to malposture in general. The vertebral osteochondritis of Calvé is rare and has no bearing on scoliosis, but the *osteo-chondritis deformans juvenilis* or vertebral epiphysitis of Scheuermann, named from its resemblance to Perthes's disease, is also widely held to be a manifestation of late rickets. It leads to structural kyphosis and Engelmann, who believes the condition to be late rickets, has shown that such kyphosis contained a degree of scoliosis. The ossification of vertebral bodies occurs from one centre in the body and two in the arches, which unite between three and eight years. The length growth is due to the epiphyseal ring, beginning to ossify about the fourteenth year and fusing soon after the twenty-second year.

With vertebral epiphysitis there is an associated irregularity of the vertebral body and some radiological clinics have found positive evidence of epiphyseal disease in 83% of their lateral curvatures. But there would appear to be more support for this condition being a manifestation of late rickets. Summing up present conceptions of ætiology, it may be said that idiopathic scoliosis is

a systemic disease with incidence on the spinal column and that there is considerable evidence to indicate its place among the diseases of faulty bone development, in the causation of which nutritional factors constitute the prominent but probably not the only part.

Prophylaxis.

In regard to prophylaxis, the interest shown in the school period is belated, if we are to accept the chief factors of ætiology as indicated here. Prophylaxis is certainly of importance here in view of the great difficulty of dealing with established scoliosis. A child with an obligatory malposture should be recognized as a scoliotic child. A period of danger is the rapid growth period three to five years. Dietary insufficiency must be guarded against, particularly in respect to vitamin *D*, and it must be remembered that the value of nutrition in this regard is inversely as the age and marked protection is afforded by correct ante-natal dietary from diseases of faulty bone development.

Treatment.

As regards treatment, it must first be decided whether treatment is at all necessary in some cases. It would appear certain that a small proportion of cases reach a natural compensation with a minor degree of deformity and especially is this so toward early adult life. In many such cases there will be no appreciable advance of the curvature. One should no more think of correcting such a condition than we would the compensatory bony curvature of the hod carrier. Such persons have good muscle efficiency and we presume the active basis has ceased.

For purposes of treatment, the lesion may be taken in two aspects, postural and structural. It is obvious while idiopathic scoliosis is in a postural stage, that is, without fixation, if we are to accept the causation discussed earlier, that we have an active bony lesion and we are dealing with a systemic disease. While general measures slowly influence bone metabolism, it is essential that no fixed deformity be allowed to develop and there must be avoidance of malposture which might determine a curve. Hence clothing and school conditions are minor factors, and rest, including recumbency periods, is desirable. It is at this stage that gymnastics, general and corrective, have their greatest value, and it goes without saying that these should have expert supervision and that half measures are not of much value. Flexibility of the spine must be equal and if necessary this should be attained passively. My own practice in this regard is the use of the Haglund frame. As will be expected from the nature of the systemic causation, treatment must continue for some years. I do not think massage or other physical therapy of any great value. The prognosis is good here for complete cure.

When idiopathic scoliosis reaches a structural stage we have the additional factor of fixation to deal with, and diverse opinions exist as to the aim of treatment and the methods of accomplishment. In mild structural scoliosis, corrective and general exercise may be persisted with along with active and passive correction, but only so long as improvement is progressive. Two separate periods of an hour per day where possible should not be an excessive period for gymnastics, provided no detrimental symptoms arise. Here the location of the curve will affect the prognosis. Very high curves are most difficult to deal with and lumbar curves are resistant.

In the more marked curvatures other considerations arise. The scoliosis commission in America was not able to find any example of over-correction of structural scoliosis. To what extent can such a spine be straightened, granted that this is desirable?

It would seem to be established that the more severe methods of forcible treatment which attain some rapid correction are severe on the patient, and such mobilizations are often not possible of retention actively by the patient, leaving the alternatives of relapse (sometimes greater than the original), mechanical retention or fusion. But where such *redressements* are carried out very gradually over a long period of time, it is probable that greater success is attained in voluntary retention, particularly where correction is obtained, chiefly through derotation and deflexion, such as is practised by Galeazzi, who has also been successful in attaining probably the greatest structural correction. It is the practice at this clinic in Milan, where correction cannot be actively retained, for the patient to wear a retentive brace until full growth is attained. The success attained in Milan is partly due to the most thorough mobilization in the elaborate apparatus of Schulthess, with additions by Galeazzi, over a long period of time and this is followed by many successive corrections in the Galeazzi apparatus. Such treatment is long continued, but I do not agree that it is harsh on the patient. In a large number of such treatments no discomfort was noticed in the patient. It is interesting to note here that in this clinic, where probably the greatest corrections are being recorded, no operative fusion is performed.

In a number of other methods of treatment, a position of compensation is sought, rather than a maximal correction of the curve. This principle was enunciated more fully by Steindler in a paper on the compensation treatment of scoliosis in London in 1929. In brief, the more rigid portion of a curve is retained and a compensatory converse curve induced to an equal degree, above or below, so that the general alignment of the shoulders over the pelvis it attained. The alternatives are then offered of voluntary retention, mechanical support or spinal fusion. But with compensation attained, a greater proportion are enabled by gymnastics to maintain an active retention. Naturally less time is taken up than with such methods as aim at the maximal structural correction. Where for any special reason an optimal result is desired, as for example æsthetically, with time not a factor and a patient of robust health, then a Galeazzi routine would

probably give the best result. But the mechanotherapy is elaborate and costly and the special machine necessitates long training. I do not think there is much to be gained by a full survey of the numerous methods of plaster correction, with a consideration of the best spinal postures for optimal correction; but, for the average case, I feel that compensation is to be sought rather than maximal correction and that for compensation we do not require the uncomfortable spinal positions desirable theoretically for optimal correction. I, therefore, use the upright position and, since this is the ambulatory position of the patient, a more comfortable plaster can be achieved. A Haglund frame meets these requirements satisfactorily. Though I personally practise with this frame, I believe excellent results are attained by the Turnbuckle jacket and other methods. But I take it we are concerned not so much with individual techniques as rather with principles, and in the marked structural types of idiopathic scoliosis I think these principles may be enunciated as follows:

1. Mobilization, but only to such a degree as will enable compensation, if attainable, with the rate of mobilization limited to the increasing capacity for voluntary retention.

2. *Redressement*, to attain compensation if possible where mobilization alone fails.

3. Retention.

It remains for us only to discuss the last principle of retention. It has been already noted that operative fusion is not done at the Galeazzi clinic, nor in general is the procedure much in use in Europe and only to a limited extent in England. As regards idiopathic scoliosis, if the fundamental causes are those here stated, then, I believe, for such spines, if kept from deformity during what we may call the acute stages (or if fully or partly corrected from deformity and then kept sufficiently long in corrected position), a favourable condition for active retention at full growth should eventually be established in the majority of cases. The maintenance of position may be expected in time to produce a change in the shape of the vertebræ, according to Wolff's law. Lane has demonstrated skeletal changes in response to heavy loads. Structural scoliosis can be produced experimentally by constant long continued malposture. Bone under pressure changes shape after growth has been reached. Next, there is certainly no need to carry out fusion in a patient who has good active compensation. Recognition of fundamental causes should reduce the occurrence of this scoliosis and with earlier recognition diminish the number of advanced types from which the fusion cases come. In another fair proportion of cases retention by a suitable support is satisfactory. There will be some few cases in which fusion may be desirable, but this as a rule is better done when growth has ceased. Fusion in children has been followed by increasing curvature. The operation is one of some magnitude and it is probable that the method at present should not be regarded as a routine measure. The various types of operative fusion are on trial and it is perhaps early to get an accurate evaluation.

SWIFT'S OR PINK DISEASE: RECENT WORK ON PATHOLOGY AND TREATMENT.

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Of the various intractable chronic diseases of childhood pink disease or erythrœdema easily holds first place. The combination of skin irritation, sleeplessness, refusal of food, wasting, photophobia and general misery, to name merely its outstanding features, causes the destruction of family happiness for months at a time.

Clinical Characters.

It is a disease still too little recognized, though one would think that by this time most practitioners had come to hear of it. Probably this is owing to the fact that there have been so few good accounts of it in text books. The most complete is that which was given by Dr. A. Jeffreys Wood[1] at the 1920 Congress and reprinted in THE MEDICAL JOURNAL OF AUSTRALIA, February 19, 1921,[1] while Dr. Wilfred Evans published an eminently practical article on diagnosis in the same journal on July 18, 1931.[10]

A good review with fairly complete bibliography is given by Wyllie and Stern.[2]

The following is a very short summary.

Age. Four years seems the usual upward limit, there having been no cases in children over four years and six months in my own experience. Wyllie and Stern speak of examples up to seven years as known.

Sex. Boys and girls seem equally affected.

Season of the Year. Early summer or late autumn are the most usual times, but there is no decided time for its appearance.

Onset. The onset is insidious. In one case (a boy of three years and eight months) it was ten weeks before the diagnosis was obvious, but well marked cases have developed in a fortnight.

Previous Illness. Usually there is no history of previous illness. Often the history is that of a normal healthy child. There may be an initial infection of the upper respiratory tract. Breast fed or bottle fed children seem equal sufferers.

Symptoms. Refusal of food is often the earliest symptom, until finally the child seems to take nothing except a little milk and water. Sleeplessness is also an early symptom and is uncontrolled by any ordinary doses of hypnotics. The child is utterly wretched, and the cry of misery which it utters is almost pathognomonic. Photophobia is variable; it seems to be more constant in advanced cases. Muscular laxity, either the result of starvation or a specific muscular weakness, may appear very early. This laxity with the photophobia is the

chief factor in producing the characteristic attitude described by Wood:

> The symptoms of erythrœdema are most characteristic when well developed. The child is carried into the surgery with the head bent down, generally into its mother's chest, or frowning with half-closed eyes as though it dreaded the light, and refusing to look up; usually it is whining and fretful.

The Skin Manifestations. Sudaminal rashes of varying severity and duration appear on body and limbs, accompanied by a degree of itching which drives the child to constant scratching, requiring constant nail-paring to save the skin. In regard to the pink hands and feet, Wood's words cannot be bettered:

> The redness of the hands and feet, accompanied by an icy coldness to touch, is the most characteristic symptom of this disease. The redness, as a rule, is limited to below the wrist line, although I have notes of one or two cases where it has been noticed above the wrist. It is usually persistent once it appears, but, as previously stated, it is not always present in the early stages of the disease.
>
> The loss of finger and toe nails is by no means rare; one patient shed his toe nails five or six times in the course of his thirteen months' illness.
>
> With the redness and coldness there is also sweating and the formation of small vesicles about the fingers and toes. It is the scratching at and breaking of these vesicles that frequently start the ulceration.

The Digestive Tract. Diarrhœa occurs inconstantly. "Dribbling" is common. Mucous membranes of the mouth may show ulceration. Teeth may come out and even an upper jaw lose a tooth-bearing alveolus.

Nervous Signs. The deep reflexes are usually active at the outset, and may disappear altogether in the later stages. There seems no actual paralysis of the muscles, but merely a loss of tone and flabbiness. Several observers have described areas of anæsthesia; these are difficult to estimate exactly as the children are usually so immersed in their own misery that a very decided external stimulus has to be applied to attract their attention.

Circulatory System. There is no actual œdema. The swelling of the hands and feet is a swelling of the horny cells and not an extravasation of fluid. High blood pressure has been often recorded. The estimation of blood pressure is fallacious in any child under ten and in these wretched small children I have not been able to satisfy myself of the reliability of my results.

Bronchitis and bronchopneumonia are two dangerous complications in the southern States.

Relapses may occur. I have seen one after nine months' freedom from symptoms.

The mortality in this State is not high; in the southern States some observers speak of a 50% mortality. The dangers are these: (i) Bronchitis or bronchopneumonia; (ii) sepsis from ulcerated areas, such as the gums, following necrosis of bone; (iii) sudden death. (This last I have not seen.)

Our more favourable climate is, no doubt, responsible for the better outlook in Queensland.

If, however, the mortality is not high, the course is apt to be prolonged; and the illness is apt to be a most trying one for all concerned.

Morbid Anatomy.

Wyllie and Stern in their article summarize the various changes that have been found, beginning with the first examination of the nervous system by Greenfield and Paterson[3] in 1923, and including seven fatal cases of their own. As Wood pointed out, the fatal issue is usually determined by a bronchopneumonia, but three cases of Wyllie and Stern seemed to be uncomplicated.

They sum up the only characteristic findings as follows, their own being in agreement with others.

In the nervous system there is a diffuse infiltration with round cells, never rising above the medulla and most prominent in the cervical and lumbar enlargements. Early chromatolytic changes of an "axonal" type occur in the nerve cells in these areas, especially those of the anterior horn cells. The changes are secondary to a degeneration of the peripheral nerves and are a very constant finding. It should be noted, however, that Kennedy and Kernohan[4] consider the primary change as central. Muscular atrophy of the type seen after a nerve lesion was occasionally seen. Changes in the sympathetic and parasympathetic nerves were also seen.

Ætiology.

There are three principle theories and according to these the condition is: (*a*) a deficiency disease, (*b*) an infection, (*c*) an infantile form of pellagra.

For the last, suggested by Wood in 1927,[5] the possibility has gone in view of the work of Goldberger and others[6] on pellagra as a vitamin B_2 deficiency disease. For the other two theories there seems an equal lack of definite evidence. All observers have failed to achieve any constant or significant bacteriological findings, with the doubtful exception of Butler, Penfold and Wood.[11]

The condition produced is apparently a disturbance of the vegetative nervous system and it has also been suggested that this is an inflammation, parallel to anterior poliomyelitis on the one hand and *herpes zoster* on the other. Of this again there is no proof.

Wyllie and Stern write:

> From a clinical survey of pink disease, it is apparent that nearly all the symptoms are due to a disturbance of the vegetative nervous system (sympathetic and vagus). This important fact has been especially emphasized by Feer, who drew attention to the rise of blood pressure and of pulse rate during the disease without any corresponding rise of temperature or respiratory disturbance. The outstanding symptoms of "vegetative" disturbance are vasomotor paralysis at the extremities, acceleration of the pulse, raised blood pressure, excessive sweating, and trophic changes. To a similar cause, in all probability, are due the photophobia without conjunctivitis, the rhinorrhœa, the sialorrhœa and the anorexia. At a later stage of the disease evidence of lower (spinal) neuron implication is often discernible in the abolition of the tendon jerks and the presence of analgesia. In an uncomplicated case other systems than the nervous are unaffected.
>
> *Discussion.* From a consideration of the foregoing pathological examinations the essential lesions in pink disease would appear to lie in the skin and in the nervous system. The lesion in the skin is, according to Butler, not pathognomonic. He described exactly similar changes in the skin in a case of acromegaly. In the nervous system,

the evidence for a characteristic and pathognomonic lesion is somewhat meagre, but in the majority of cases in which the peripheral nerves have been examined, evidence of some degenerative change has been forthcoming.

Chromatolytic changes in the anterior horn cells of the spinal cord may be due to a large number of causes, but the fact that these changes in pink disease occur in the spinal segments corresponding to the nerve supply to the limbs suggests that such chromatolytic changes are due solely to an "axonal reaction". The significance of the cellular infiltration of the spinal cord and nerve roots which occurs in a proportion of cases cannot as yet be explained.

A view slightly divergent from the avitaminosis theory is held by Findlay and Stern,[8] who, as the result of experimental work on rats, suggest that the absence of a dietetic factor other than the known vitamins is responsible for the causation of pink disease. They produced a condition in young rats, clinically resembling pink disease, by feeding them with dried egg white as their sole source of protein, the rest of the diet being adequate and rich in vitamins. The same condition was produced in breast-fed rats by feeding the mothers on a similar diet. Attempts at culture from the affected animals were unsuccessful. Attempts to reproduce the disease by means of intraperitoneal or intracerebral injection of blood or emulsions of the spinal cord from the affected animals were also unsuccessful. Pathologically, degenerative changes were found in the peripheral nerves, and the same curious cellular infiltration of the spinal cord that has been described in pink disease was observed in the cords of the rats. Although the formation of a toxic substance during the drying of the egg white must be considered as a possible factor, the experimental evidence certainly suggested that an essential factor in the diet was lacking, especially as the condition was rapidly cured by the addition of raw liver to the diet. The authors tentatively suggested that if the condition which they produced experimentally was identical with pink disease, then a dietetic factor in addition to the known vitamins is necessary for normal nutrition in the young child.

It is rather interesting that at the discussion following Wood's paper at the 1920 Congress, Dr. Donald Luker suggested that the condition was a disturbance of the vegetative nervous system—a chronic sympathetic stimulation by the toxic molecule of split protein.

This view has not been put forward elsewhere and no experimental work has been done on it.

In fact the only experimental work of any success whatever was that of Boas,[7] confirmed by Findlay and Stern,[8] who produced a syndrome in rats very clearly resembling pink disease by feeding them with the following diet:

For 20-30 gramme rats:

Dried egg white	100 grammes
Wheaten starch	250 grammes
Salt mixture (McCollum, Simmonds and Pitz)	25 grammes
Cotton seed oil	75 grammes
Lemon juice	25 grammes
Marmite	25 grammes
Distilled water	300 cubic centimetres

With five drops of cod-liver oil daily.

Diagnosis.

As Wood says, the well established case is diagnosed at a glance.

The following conditions have been confused with pink disease: Rickets, from the general weakness and sweating; scurvy, as with rickets, but often the gums and skin hæmorrhages may add to the uncertainty; infantile paralysis, owing to the muscular flaccidity, loss of deep reflexes and irregular range of affected muscles; lead poisoning (in the mild chronic cases), owing to restlessness, pain and sweating, and laxity of muscles.

Treatment.

The course is self-limited and extends from three to eighteen months. Should these children be sent to hospital or not? Opinions differ greatly. My own feeling is that it entirely depends on the home conditions. If the child can be looked after by the mother (it is usually a whole time task) they are better at home; otherwise hospital treatment should always be considered. Hospital treatment may be necessary at times to save a worn out mother and family.

Hypnotics are of little use. The barbiturates may be tried and morphine in surprisingly large doses may be necessary.

In regard to food, Wood recommended fresh cow's milk, a very good diet if obtainable, otherwise pasteurized milk or a powdered milk. Apparently taste is badly affected.

Local treatment to the skin seems to be of little effect.

Special measures of treatment have been advocated.

Bruton Sweet in 1930,[9] following a series of successful cases, advocated artificial sunlight with the mercury arc. Dr. Rupert Downes, of Melbourne, tells me that he has had excellent results in the use of this light as an hypnotic measure. In Queensland there is an almost constant supply of natural sunlight and I have used this very successfully on the Rollier system of gradual exposure, always shading the eyes with a large hat.

Some parents have reported excellent results from sea bathing.

But all these forms of treatment have been merely palliative and in spite of all efforts the wretchedness has lasted weeks and months longer.

In 1929 Findlay and Stern published in the *Archives of Diseases in Childhood* "A Syndrome in the Rat Resembling Pink Disease in Man".[8] Their account of artificial production of the disease by dieting and treatment with liver extract did not accord with any accepted account of the pathology, but they were followed by Wyllie and Stern, who, in 1931, described several cases in children successfully treated by liver extract.

Since reading their article I have seen several cases of pink disease. But these have been mostly in children who have come from the country and whom I did not see again. Reports received from the parents, however, suggest that the children

improved; the absence of exact detail makes them valueless.

Among these, however, there have been cases which I have been able to follow up personally and the results have been sufficiently definite and suggestive as to make them worth reporting.

The same treatment was adopted in all cases:

1. Ample supplies of raw milk when obtainable.
2. Full sunshine by gradual exposure (in some cases it was not a very gradual exposure).
3. One of the concentrated vitamin *D* preparations.
4. Barbituric hypnotics, usually phenobarbital or "Amytal", combined with acetyl-salicylic acid.
5. Sedative lotions to irritated areas.

All the foregoing had been used before I used liver extract and the results had varied greatly, so that it was doubtful whether they had any real influence or not, except apparently the sunlight.

The change consisted in the addition of liver extract to the dietary. Wyllie and Stern used fresh liver, minced and given raw with milk or port wine or as a thick soup.

The dangers of fresh liver for infant feeding on a hot summer's day in Queensland inclined me to the use of a liver extract; this had to be cheap, easily used and palatable. The form finally used was the "Exhepos" of Taylor and Elliott, a pig liver preparation resembling "Bovril" in appearance. It can be made up as a soup or mixed with other food. Adults generally do not consider it palatable; children with pink disease will often take it freely undiluted.

The dose for an adult patient with pernicious anæmia is 5·0 to 10·0 mils three times daily. The "pink" child seems to find five mils twice a day sufficient.

In one child who took all food very badly, I used the "Hepatex P.A.F." of Evans, Lescher and Webb, given intramuscularly. The child did not seem upset and its condition improved, but as the parents were going back to a place where fresh liver could be safely used, I did not continue with it. (His own doctor reported rapid improvement at home on fresh liver.)

Case Reports.

The following are the case reports of six children whom I have been able to watch in the later stages myself.

CASE I. Master K., aged one year and seven months, was convalescing at the seaside after acute nephritis and double *otitis media*. He was at first improving rapidly, but was then noticed to be refusing food, growing irritable and sleeping badly. When seen some three weeks after the onset of symptoms, he was flabby, irritable and almost worn out from starvation and lack of sleep. His body was scarred with scratching and his clothes were damp with sweat. His hands and feet were red, swollen and cold. His muscles were flabby and he sat crumpled up with shaded eyes. He had lost nearly 0·908 kilogram (two pounds) in weight in less than a fortnight.

He was given the standard treatment and five mils of "Exhepos" twice daily, which he ate eagerly after the first day. Two days later he had a more comfortable look and was no longer scratching, while his appetite had improved to the extent of taking milk well. By the end of a week he was sleeping soundly and his hands were less swollen. By the end of the following week he no longer wished to be nursed continually, he was sleeping well and taking his food well; and at the end of a month he was without symptoms.

He gained 1·362 kilograms (three pounds) in weight during the following three months. He kept on the liver extract for three months as a precautionary measure and did not look back, except for a transitory bowing of the legs, which was rapidly corrected by diet, splints and sunshine.

CASE II. Baby P., aged two years and four months, came down from the country with a history of comparatively normal infancy, except for pyelitis and doubtful lead poisoning, followed by a mild nasal infection. For two months previous to being seen on October 6, 1932, she had been growing more and more weak and flabby and would neither eat nor sleep, her hands had grown clammy and red and she sweated profusely.

There was no rash and no photophobia. She had grown too weak to stand and sat in the usual crumpled position. Her weight was 8·75 kilograms (nineteen pounds eight ounces), a drop of 0·67 kilogram (one and a half pounds) from her normal weight. There were a few small ulcers in her mouth.

When she was seen after a fortnight in the hospital where she had been vigorously treated with liver, milk and sunshine her condition had greatly improved and she had gained 0·22 kilogram (half a pound) in weight. She was eating well (especially liver) and sleeping well; her body was less limp, while the hands and feet were warmer and less red, but curiously enough there was a slight photophobia.

She also went straight forward. Fortunately she ate well, but late in November had a severe transitory gastro-enteritis and the weight fell to 8·5 kilograms (nineteen pounds) from nearly 9·4 kilograms (twenty-one pounds).

CASE III. Baby R. was seen with Dr. Mortiner Hishon in September, 1932. Her age was one year and three months and she gave a history of normal infancy.

This present illness began with "teething trouble" eight weeks previously; she cried constantly, insisted on being nursed and became so weak and flabby that she could neither walk nor sit, although her appetite remained good; she never slept and was utterly wretched. No photophobia was present. There was profuse bodily rash and sweating. The hands were badly torn from scratching, red, swollen and sweating, but not excessively cold. Some of the nails were separating. Her weight was 9·7 kilograms (twenty-one pounds six ounces). There was a profuse miliarial rash on the body, with extreme nail-scarification. The tonsils were enlarged and slight bronchitis was present. Five teeth had been lost in nine days. Altogether there was material here for a severe case, with probably prospective months of misery and a very possible ending with bronchopneumonia or septic alveolitis—the most dangerous of all complications.

The treatment suggested was milk, liver and sunshine. For some weeks there was little improvement. The bronchitis was persistent and the child had an evening temperature of 39·4° to 40·5° C. (103° to 105° F.). In early October the skin irritation seemed to improve, but decided improvement appeared only after a severe bowel disturbance late in October, with which were associated three large bowel hæmorrhages; this was six weeks after the beginning of treatment. Meantime, some teeth and fragments of bone had come away from the upper and lower jaws, making seventeen in all. Sleeplessness was persistent and more than once the outlook seemed quite hopeless.

Once improvement began it was very rapid, the child slept and became afebrile, the skin cleared up, the gums healed, but the cough and slight bronchitis persisted. The six weeks after the improvement appeared were spent in gaining weight (0·567 kilograms or one pound four ounces), relearning to walk and replacing finger nails. Except for much enlarged tonsils and a moderate degree of bronchitis the child is now almost normal.

It was remarkable that in this case "Exhepos" and "Viosterol" were taken readily throughout the illness.

CASE IV. Baby A.B., aged one year, while holidaying at the seaside, became intensely irritable, refused to sleep and refused food. She lost 0·34 kilogram (twelve ounces) in five days. There was only slight photophobia, but the skin of the body was irritable, the hands were cold and the fingers pink, while the flabby muscles were allowing the body to assume the characteristic crumpled attitude. There were a few small sores in the mouth and the whole make-up suggested an early but definite and rapidly progressing erythrœdema.

The child was given five mils of "Exhepos" twice a day, and an hypnotic powder. Two days later he was sleeping and eating well and in a week's time the hypnotic powder was discontinued and the child seemed normal. A fortnight later his family doctor wrote to say that, except for a little irritability, the child was very well.

CASE V.—J.W. was aged four years and six months. The patient was a female and there were two younger healthy children in the family. She had previously been healthy. At the end of November she was treated in hospital for tape-worm for one week; she went out cured and seemed well for a week. Then she grew languid and was irritable and unable to sleep. Her appetite was good; the feet and hands became pink and swollen and the skin peeled off. An intolerable itchy rash developed on the body and she scratched herself badly; photophobia appeared after a fortnight. She lost weight, became weak on her feet and began to crumple up. When seen on February 10, 1933, she was wretched, irritable and wasted. There was definite photophobia, lips and mouth were sore and gums showed early ulceration. The weight was 12·0 kilograms (twenty-six and a half pounds). The trunk muscles were flaccid and the child "crumpled" when sitting.

There was a rash on the trunk and limbs and signs of scratching were present. The heart and lungs seemed normal. The hands and feet were cold and bluish pink; desquamation was finished; ulceration was present about the nails. She could just walk. The knee jerks were absent. No sensory disturbance was discovered.

She was given general treatment with liver extract and phenobarbital. Five days later there was distinct improvement, for two nights past she had slept well and had gained 1·1 kilograms (four ounces) in weight. She had much less photophobia and was sunbathing happily. The mouth was no longer sore. Appetite was still very capricious; she was enjoying liver. The feet and hands were still pink and clammy. The feet were still itching; she scratched herself; one nail was separating and one ulcer was present on the dorsum of the foot. The rash on the body was still troublesome. The knee jerks were still absent.

Treatment was continued with substitution of "Sodium amytal" 0·1 gramme (one and a half grains) nightly and a solution of prechloride of mercury one in 5,000 was used as a skin lotion. On March 5, 1933, her condition was greatly improved. She was sleeping well, seven hours by night and one hour by day. "Amytal" was required only one night in three. Her weight was 13·3 kilograms (twenty-seven pounds two ounces). She was eating with a little coaxing milk and starchy foods. Two ounces of fresh liver or liver extract were taken every day. She was sleeping well. She was brighter and happier, but still had occasional feverish turns. There was no photophobia. She was stronger on her legs. No rash nor sweating and no itching were present. The sores had all healed. The teeth and gums were healthy.

This case I have reported in considerable detail as the age of the child made it of special interest.

In a sixth child, a dried liver extract was used.

CASE VI. Baby S., a male, was aged fifteen months. There was one older healthy child in the family. He was treated for mild pylorospasm from February, 1931, and recovered completely after two weeks.

When seen on February 26, 1932, he was brought up for "teething" for past ten weeks and for refusing all food. He weighed 7·76 kilograms (seventeen pounds two ounces) and looked pinched and flabby; he had a typical crumpled attitude with a complete flaccidity of the trunk and limb muscles. He slept badly and needed to be nursed at least two hours every night. There was no photophobia. Ulcers of the mouth were present; the teeth were not affected. A "prickly heat" rash was present on the body for weeks. The hands and feet were red, peeling profusely, and cold.

He was put on a dried liver extract as he was said to dislike soups (an amount the equivalent of 100 grammes fresh liver), full milk diet and a powder of phenobarbital 0·06 gramme and "Amytal" 0·03 gramme every night. By March 4, 1932, the child was obviously better; its hands were peeling freely, but there was less skin irritation, food was being taken well and the child was sleeping soundly, though the ulcers in the mouth were still troublesome. The weight was 8·5 kilograms (eighteen pounds two ounces).

The improvement continued and a month later she seemed almost normal. She slept well and needed only an occasional powder. Appetite was improving steadily. The skin was quite clear, though the fingers were a little puffy. She was crawling vigorously and trying to walk, with steadily hardening muscles. By April 13, 1932, she seemed quite normal and was very bright and happy. The weight was 8·9 kilograms (nineteen pounds ten ounces). Liver administration was stopped.

These patients who responded so well to liver treatment may have been lucky; it is as difficult to discriminate between *post hoc* and *propter hoc* in pink disease as it is in pneumonia, but the results are at least suggestive.

Pink disease is so deplorable a condition that anything which may give relief is worth trying, and so far it would appear that liver is well worth trying. It is hoped that any others who have used liver extract will record their experience.

The fact that this form of treatment was suggested in 1931 and yet seems to have been so little used, suggests that my results may be entirely coincidental. To me they did not seem so, hence their publication.

Conclusion.

In the foregoing I have given a brief account of recent work on the ætiology and pathology of pink disease, which seems to be comparatively little known. I have also described six cases which were apparently benefited by liver treatment.

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AN INVESTIGATION INTO THE INCIDENCE OF CANCEROUS OR PRECANCEROUS SKIN LESIONS AMONG TAR WORKERS IN NEW SOUTH WALES.[1]

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THIS work comprised the investigation of 85 tar workers and 129 controls. "Controls" are those men who do open air labouring work similar to that of the tar men, without any contact with tar. As controls, quarrymen, stonemasons, and a few rock-choppers were supplied by the Silicosis Committee, and some maintenance men and several gardeners were obtained elsewhere.

Although 240 tar workers were enrolled in the City Council, only 85 of these were regularly employed in tar working on the streets, and these were examined. It is regretted that more, particularly those of longer tar exposure, were not available.

The term "lesions" refers to any cancerous or precancerous condition of the skin observed in the men examined, and in this paper comprises hyperkeratoses, rodent ulcers and epitheliomata.

Tables I, II, III and IV give details of lesions among tar workers and controls according to various age groups.

TABLE I.
Tar Workers.

Age (years).	Number of Persons.	Number with Lesions.	Percentage.
21–30	4	0	0
31–40	28	3	11
41–50	20	3	15
51–60	29	5	17
61–70	3	2	66
71–80	1	1	—

TABLE II.
Showing Exposure of Workers to Tar.

Years Exposed to Tar.	Number of Persons.	Number with Lesions.	Percentage.
0–10	38	7	18
11–20	36	3	8
21–30	9	3	33
31–40	1	0	—
41–50	1	1	—

TABLE III.
Controls.

Age (years).	Number of Persons.	Number with Lesions.	Percentage.
21–30	9	0	0
31–40	26	1	4
41–50	30	5	17
51–60	29	10	34
61–70	30	17	57
71–80	5	3	60

In tar workers and controls there was noted a steady increase in the incidence of lesions, with increasing age. In Tables II and IV the number of years of exposure to both tar and sunlight give very little information, owing to their irregularity.

TABLE IV.
Showing Exposure of Controls to Sunlight.

Years Exposed to Sunlight.	Number of Persons.	Number with Lesions.	Percentage.
0–10	13	0	0
11–20	39	10	26
21–30	28	3	11
31–40	21	7	33
41–50	19	11	58
51–60	9	5	55

In order to separate the effect of exposure from that of age, various age groups were divided into equal parts comprising short exposure and long exposure men. This is shown in Tables V and VI, and from the data obtained two graphs have been made (see Graphs I and II).

TABLE V.
Tar Workers Divided According to Exposure.

Group.	Total Number of Men, Working with Tar for Various Periods.	Number with Lesions.	Percentage.
Years.			
20–40	9 years and under: 17	2 shorter exposure.	12
	Over 9 years: 15	1 longer exposure.	7
41–60	15 years and under: 26	5 shorter exposure.	19
	Over 15 years: 23	3 longer exposure.	13
61–80	20 years and under: 2	1 shorter exposure.	50
	Over 20 years: 2	2 longer exposure.	100

TABLE VI.
Showing Controls Divided According to Exposure to Sunlight.

Group.	Total Number of Men Working in Sunlight for Various Periods.	Number with Lesions.	Percentage.
Years.			
20–40	12 years and under: 17	0 shorter exposure.	0
	Over 12 years: 18	1 longer exposure.	6
41–60	25 years and under: 28	7 shorter exposure.	25
	Over 25 years: 31	8 longer exposure.	26
61–80	45 years and under: 18	8 shorter exposure.	44
	Over 45 years: 17	12 longer exposure.	71

The colouring of the men was as follows:

Of 83 tar men (2 had no description):
43 fair men included 11 with lesions = 26%
40 dark men included 3 with lesions = 7%

Of 129 controls:
54 fair men included 17 with lesions = 31%
75 dark men included 19 with lesions = 25%

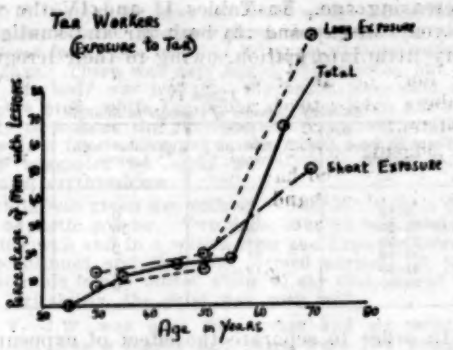
Fair men are obviously more susceptible to skin cancer than dark, but in this series the difference is not very great.

In regard to descent, it has been said that those of Irish descent have delicate skins, susceptible to skin cancer.

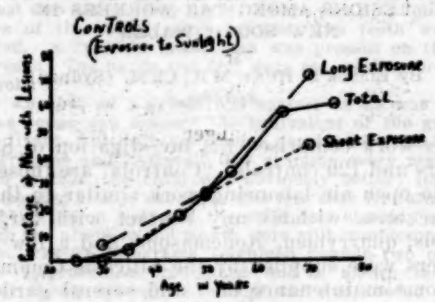
Of 15 tar men of Irish descent examined, 8 had lesions = 53%.
Of 27 controls of Irish descent examined, 13 had lesions = 48%.

These figures show those of Irish descent to be very susceptible, but, of course, are approximate only, as are many others, depending on the memory and loquacity of the men.

[1] This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.



GRAPH I.



GRAPH II.

Graph I comprises 85 tar workers in different age groups with the percentage incidence of skin lesions plotted vertically. The heavy continuous line shows the total number examined and its steep upward slope indicates that age is the main factor predisposing to lesions. In order to separate the effect of exposure from that of age, various age groups were divided into equal parts comprising short exposure and long exposure men. Among the higher age groups long exposure appears to increase the incidence slightly. On the other hand, in young men exposure to tar seems to diminish incidence, possibly owing to a protective action of the black pigment. In Graph II, 129 open air workers are recorded as controls. As before, the heavy black line shows the totals and the age groups are divided to show the differential effect of short or long exposure to sunlight in the dotted lines. On comparing Graphs I and II it will be seen from the similarity of slope that age is the main factor and that tar has little effect in producing lesions. Among the higher age groups, however, the tar curves are definitely steeper and higher, so that there may be a slight carcinogenic action, though this may be merely an irregularity due to inadequate numbers.

The Lesions.

The incidence and nature of the lesions is as follows:

Fourteen of eighty-five tar men had lesions. Four had slight hyperkeratosis, three had moderate and seven (50% of the whole number) had marked hyperkeratosis. One had marked hyperkeratosis with early epithelioma of the forearm. One had marked hyperkeratosis with four rodent ulcers on the face.

Thirty-six of 129 controls had lesions. Fourteen had slight hyperkeratosis, eight had moderate and twelve (33% of the whole) had marked hyperkeratosis. Two had rodent ulcers alone. One had marked hyperkeratosis with an early epithelioma of the hand. One had keratosis with a large rodent ulcer.

The lesions of the tar men were definitely more severe than those of the controls. Severe lesions comprised 50% of the whole number of lesions among tar men and only 33% of the whole among controls, although the latter had a much larger number of men in the later and more susceptible age groups of sixty to eighty years.

The previous tables show only lesions actually observed, and some of the 240 workers enrolled in the City Council have had previous lesions which were either cured or not available for inspection. Of these, five men suffered from skin cancer, according to health records kept for the past seven years. Adding a sixth who has an early epithelioma now and who suffered from "skin cancer" in 1919, we have six tar workers with previous lesions, which is a high percentage. Most of these cases do not bear on the present investigation, however. Three men had been treated for rodent ulcers of the face, one for an epithelioma of the lip, one died from an epithelioma of the submaxillary gland fungating later, and one had an epithelioma of the hand. Of the last only could it be said with any degree of certainty that tar was the causal factor. It is very unlikely that an epithelioma of the lip or rodent ulcer should occur from tar irritation, partly because of their position on the face and neck, and partly because they are more likely to be due to sun exposure or other irritant.

One control patient only gave a previous history of rodent ulcer of the nose. Two others had "cysts" removed from the face and neck, probably non-malignant.

Health records of the 5,500 City Council employees (including all classes of work) have been kept for the past seven years only and show 34 cancer cases.

Of the 34 men affected, 20 were open air workers and 14 worked indoors. Of the 20 labourers, 15 have external cancer, that is, skin cancer and epitheliomata of the lip (5), and 3 have internal cancer (two patients untraced).

Of the 34 men affected, 9 suffered from internal cancer and 20 from external cancer (skin cancer and epitheliomata of the lip, 5). Five patients untraced.

Protective Measures.

Protective measures were varied, as were the methods of tar removal, and both seemed to have little effect on lesion incidence. Gloves were worn by a few, and as a rule kerosene, lard or crude oils were used for removal of tar. Most men used no protection whatsoever, saying that tar seeped through any covering and made it useless.

Latest English methods advise the extensive and regular application of lanolin before tar working, claiming an almost perfect protection with ease of tar removal and marked decrease in ulceration and other skin lesions due to tar. Before this, castor oil was used as a protective, but it is now said to

be much inferior to lanolin for this purpose (see Ninth Annual Report of the British Empire Cancer Campaign, page 107).

Tar.

The vertical retort method, being a comparatively new and improved method of tar production, is used very largely in younger countries, such as Australia. In Europe and America horizontal retort and coke oven tar is used almost exclusively. With the vertical retort there is an average tar yield of twenty gallons per ton of coal. With a horizontal retort and coke oven tar there is an average yield of eleven gallons per ton of coal.

At present date in Western Australia all tar used is vertical retort tar. In South Australia 90% to 100% of tar used is vertical retort tar. In Victoria 80% of tar used is vertical retort tar. In Queensland 80% at least of all tar used is vertical retort tar. In New South Wales 70% of all tar produced is vertical retort tar, but 85% of vertical tar is used for road-making, as half of the horizontal retort and coke oven tar is used as fuel.

It has been proven abroad that high temperature tars, such as coke oven and horizontal retort tars, are strongly carcinogenic, while low temperature tars are of low carcinogenic activity, if any.

Vertical retort tar is a mixture of high and low temperature tars, but principally low. It has a large amount of paraffin and olifene hydrocarbons, with the tar acids mainly cresol and xylenol. Free carbon is present up to 10%. In horizontal retort tar and coke oven tar the tar acids are mainly phenol, many aromatic hydrocarbons are formed, and free carbon is present up to 30%.

Aromatic hydrocarbons and phenol burn severely, while pitch and free carbon are very irritating, also crude naphthalene and anthracene, and all these are produced in large quantities in horizontal retort and coke oven tars.

Vertical retort tar also has irritating compounds, such as cresol, but to a much less degree, and the large amounts of vaseline and paraffin wax present may have some protective or diluent action. It should be noted here, however, that workers in crude paraffin in Europe often develop skin cancer owing to impurities in that paraffin. One great difference between European and Australian tars lies in the free carbon content—an outcome, naturally, of the difference in temperatures of manufacture. In Europe is produced and handled a large quantity of dry, dusty, and very irritating pitch for use as fuel. In Australia there is produced only a soft and plastic pitch, non-irritating, and in much smaller quantities.

Conclusions.

At first sight there appears to be little difference between the figures given by tar workers and those of the controls, and it might be supposed that age principally and exposure to sunlight acted on both tar workers and controls to give similar results, and that exposure to tar had little or no effect. On closer inspection, however, the tar graph shows a definitely steeper and higher curve in the later age groups compared with that of the controls, although this may be an irregularity due to inadequate numbers. Also the lesions of the tar workers were consistently more severe. This points to a slight carcinogenic action of the tar on men over fifty years of age who have had a long exposure to tar.

On the other hand, however, tar appears to have a slight protective action on the younger men up to fifty years, possibly owing to its black pigment.

In the controls, age, as before, is a much greater carcinogenic factor than exposure to sunlight, although this plays a part which becomes more pronounced after many years of exposure. Graph II illustrates this well. An interesting case was 83c, a fair, red-headed, blue-eyed man of fifty-six, who had worked as a miner all his life underground, with no exposure to sunlight. He had a moderate degree of keratosis of arms, hands and ears, and had an early epithelioma removed from the lower lip ten years ago. No cause could be found for his lesions beyond age and his colouring.

Colouring, as shown, had some effect on lesion incidence, and the comparatively rare, red-headed, blue-eyed, freckled type was the most susceptible of all the fair types. Markedly so, in fact.

Dry and fine freckled skins commonly developed precancerous lesions, and a certain moist, smooth, rather oily type of skin was remarkably free.

Australia is fortunate in that roughly 90% of its tar is produced by the vertical retort method, which gives a comparatively low temperature tar of low carcinogenicity. The degree of the latter has yet to be determined on mice. The general conclusion is that the tar used in local roadwork is not a serious danger to man.

Acknowledgements.

I have to thank Dr. H. G. Chapman, Director of Cancer Research, for suggesting this work; Dr. G. Raffan, for his valuable assistance in examining the men for skin lesions; Dr. J. C. Purdy, for providing statistical data; and Dr. W. Moppett, for assisting with arrangement of the paper and compilation of the graphs.

Reviews.

PHYSICAL ANTHROPOLOGY.

According to the publishers, the aim of the University Series is to enable the average man to acquaint himself with the main facts of the many cultural subjects that lie outside his specialty. It avoids the presentation of them in confusing detail and attempts to interpret them and to show their relation to everyday life. These objects are admirably attained in the small volume, "The Races of Man", by Dr. Robert Bennett Bean, Professor of Anatomy in the University of Virginia.[1]

The author describes man's ascent from the most primitive primates, the tarsioids, and then gives a brief but

[1] "The Races of Man: Differentiation and Dispersal of Man", by R. B. Bean, M.D.; 1932. New York: The University Society. Royal 8vo., pp. 138, with illustrations.

adequate account of prehistoric man. He discusses the factors that influenced man's evolution and traces the development of his chief characteristics. He states that modern man arose in Europe as *Homo neanderthalensis*, and he apparently accepts Griffith Taylor's theory that his spread over the earth was largely determined by climatic cycles.

The latter half of the book is devoted partly to a description of man's occupation of the earth, under the three heads of dispersal by spreading, by invasion and by migration, and partly to an account of the physical and psychical features of his three great races, the white, the yellow-brown and the black, and their sub-races. The story of the dispersals is made easy to follow by the provision of numerous maps, and the whole book is profusely illustrated by photographs of restorations and racial types. Appendices give useful geological and anthropological information in tabular form, and there are a glossary, a bibliography and a good index. The author's manuscript had the advantage of revision by Dr. Ales Hrdlicka.

ENTOMOLOGY AND MEDICINE.

MEDICAL SCIENCE has developed with many surprises along many lines since 1898, when Ronald Ross discovered the part played by the Anopheles mosquito in the transmission of malaria.

A new "Medical Entomology",[1] written by Robert Matheson, of the Cornell University, will provide interesting and almost startling reading to those who are not altogether familiar with the extraordinary advance along one of these paths and which has brought the study of certain insects into what must now be termed an important branch of medicine. It is not so very long ago that the medical student went through his entire course without ever hearing about any insects whatsoever—they played little or no part even in the zoology course of his forgotten first year.

A knowledge of tropical disease, and incidentally of some of the ills which are most devastating by reason of their wide distribution and endemic character, demands very considerable familiarity with the insect group and those related arthropods, the ticks and mites. But it would be wrong to assume that the tropics were alone in inspiring this need.

A little list, just as a reminder, brings together malaria and the mosquito, yellow fever and the mosquito (another genus, however); black-water fever, dengue and filariasis are all to be linked up with the same group of troublesome insects. Plague suggests the rat flea; the deadly sleeping sickness of Africa calls to mind the tsetse fly; kala azar, oriental sore, and the less well known pappataci fever and oroya fever invite attention to the dangers of sand flies. Chagas disease is possibly transmitted by bugs. The peril of lice when typhus is about is surely still a vivid memory of war time horrors, and in addition this old familiar human pest has to answer for a part in the transmission of trench fever and relapsing fever. One could go on and on, but this is more than enough. It has been calculated that malaria alone is responsible for 2,000,000 deaths per year and a cost to the British Empire of £50,000,000 annually.

It may prove equally surprising to those unfamiliar with this side of medicine that upwards of twenty-one specialists of repute have lost their lives directly owing to their researches since 1900. Our author, who, by the way, is refreshingly original in his outlook, gives an "*In Memoriam*" list on one of the early pages. There is a tragically big representation of Britishers in it. Yellow fever, typhus and rocky mountain fever are the three most sinister plagues in this record.

We like this book. The publishers' advertisement is not far out in stating that "it is practical in content, definitely helpful, and thoroughly up to date". It is unusually bright and practical for a work of this kind (as a matter of fact there are not many "medical entomologies" in existence, for most of the literature, terrifying already in amount, is scattered throughout the world's journals).

Take, for example, the chapter on the louse. The author describes with excellent illustrations (a feature of the book) the anatomy of the creature and its life history. He then discusses its habits and modes of dissemination (with a poem by Burns to emphasize a point by the way). Following this the relation of lice to disease is clearly, interestingly and shortly summed up, and incidentally some indication is given of the disease symptoms to be noted. The section concludes with full details of delousing operations and, let it be noted, a list of references to modern literature. This is not an isolated example; the same plan is followed throughout the book. There is no "padding" in the 489 pages.

The title of the volume is slightly misleading, because the work contains references to mites, crustacea (Cyclops, vector for Guinea worm), ticks (rocky mountain fever *et cetera*) and spiders, but since all these creatures are related to the insects and will come under the medical entomologist's attention, the use of the word "entomology" is excusable. The few minor blemishes noted are more than balanced by the practical arrangement and modern treatment.

It is a book which should be particularly useful to departments of public health and to workers in the tropics, although it can be equally well recommended for use in other latitudes.

HÆMORRHOIDS AND VARICOSE VEINS.

THE recent popularity of the ambulatory methods of treatment of hæmorrhoids, varicose veins and allied conditions has produced a large crop of practical manuals.

The present work by McAusland is an essentially practical exposition of the subject.[1] Within the compass of sixty-two pages he gives a dogmatic statement of the methods that a large experience has taught him are satisfactory in these fields.

The style is inelegant, and errors are frequent. Many are of such a nature as to be readily recognizable; but the statement on page 12 that certain "workers have used quinine and urethane" (instead of quinine and urea hydrochloride) might lead the unsuspecting into a position where he is faced with serious hæmorrhoidal sloughing. Nevertheless the novice might do much worse than study the methods described in these pages, although we feel that the complications of the various treatments are somewhat under-estimated.

The very reasonable price should insure a ready sale for this practical hand book.

MORTAL MAN IN HISTORY: A CORRECTION.

IN the review of "Idols and Invalids", by Dr. J. Kemble, published in our issue of August 12, 1933, a misstatement has been made. In the discussion on Queen Anne it is stated that the author concluded that Anne was homosexual. This is not so. The author points out that certain psychologists have branded Anne as homosexual. He combats this view as repugnant to the medical mind. We tender Dr. Kemble an apology for having misstated his argument.

[1] "Medical Entomology", by R. Matheson, Ph.D.; 1932. London: Baillière, Tindall and Cox. Royal 8vo., pp. 503, with illustrations. Price: 29s. net.

[1] "The Cure of Hæmorrhoids, Varicose Veins and Ulceration and Allied Conditions by Modern Methods of Injection and Bandaging", by S. McAusland, B.A., M.D., Ch.B., M.R.C.S., L.R.C.P.; 1933. London: John Bale, Sons and Danielsson, Limited. Demy 8vo., pp. 69, with illustrations. Price: 3s. 6d. net.

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

CANCER OF THE RECTUM.

CANCER of the rectum accounts for 3% of all cancers and for 80% of cancers of the bowel. It is therefore a subject worthy of study by all medical practitioners. Admittedly the treatment of rectal cancer should be the province of the expert in surgery or radiation. The surgeon must know when to operate, when to hold his hand, and when to collaborate with or pass the patient on to the radiation therapist; the radium or deep X ray therapist must have clearly in his mind the type of growth for which his treatment is suitable, and must be prepared to collaborate with the surgeon. Knowledge of this kind can be gained only as a result of years of training and of wide experience. As a rule, however, neither the surgeon nor the radiation therapist has the opportunity of making a diagnosis of the condition in its early stages. This is more often than not the duty of the general practitioner. The subject can thus be discussed clinically from two aspects, that of diagnosis and that of treatment.

The purely academic student of medicine might say that there was no need to lay stress on the diagnosis of rectal cancer, since, according to some writers, 95% of rectal cancers can be discovered by digital examination. Coffey has stated that of the patients with rectal cancer first seen by a surgeon, only 50% have operable tumours. This is not always due to failure of the patient to seek advice, for cachectic patients with symptoms strongly suggestive of intestinal disorder are sometimes allowed to reach their dire state without having been subjected to a simple and revealing rectal examination. The tragedy of neglecting rectal examination is made so much greater because every rectal cancer is operable if it is discovered early enough and because the period of time during which it remains operable is longer than the operable period of the majority of other cancers. The growth of rectal cancer is notoriously slow and metastasis does not readily occur. These features have, among others, been discussed recently in an anatomical and pathological study by Dr. W. Quarry Wood and Professor D. P. D. Wilkie.[1] These authors describe four ways in which carcinoma of the rectum may be spread: locally by direct extension, by the blood stream, by the lymphatics, and by peritoneal deposits. They refer to the slow growth of rectal cancers by extension of the primary tumour, and point out that growth takes place more readily in the circular than in the longitudinal direction. Cheatle, it may be remembered, has stated that the intramural spread is not greater than five centimetres beyond the visible edge of the growth. This statement is of importance when considered in conjunction with some of the findings of Wood and Wilkie. They have studied one hundred specimens removed at operation. They made careful dissection of the specimens and examined the glands histologically. In all, 1,123 glands were examined, or 11·23 per specimen. Forty-nine of the specimens were entirely free from glandular invasion. In fourteen of the remaining fifty-one only one gland was affected, in thirteen two glands were involved, and twenty-four had severe glandular involvement. They found that the glands that were largest and most easily found were enlarged as a result of septic infection from

[1] *Edinburgh Medical Journal*, July, 1933.

the ulcerated surface of the growth. They are obviously justified in their statement that the common association of malignant disease of the rectum with enlargement of lymphatic glands due to inflammation should be borne in mind in deciding for or against radical operation. In other words, "it is almost impossible from mere palpation of lymphatic glands to judge whether they are malignant or not, and it is a mistake to be deterred from undertaking a radical operation by the presence of enlarged glands".

Certain investigators have tried to apply the grading of tumours to malignant disease of the rectum. The results have not been satisfactory. Wood and Wilkie have graded their tumours by noting the anatomical features and by using a modified Broder's classification. They claim by this means to have attained a greater degree of accuracy than was previously possible. At the same time they point out that the histological structure may vary considerably in different parts of the tumour and that it can be graded only by a complete examination and by noting the type of structure that predominates. They are quite definite in their statement that conclusions based on examination of small pieces of the tumour are certain to lead to error. Satisfactory though the method used by Wood and Wilkie may be, it is obvious that it can be used only in determining the prognosis after a radical operation has been performed. We may well ask ourselves whether the establishment of a satisfactory pre-operative system of grading would be for the ultimate good of the patient. If a malignant tumour of the rectum is to be excised, the excision must be radical. It is quite likely that any decrease in post-operative mortality consequent on a more limited excision, undertaken as a result of pre-operative grading, would be more than counterbalanced by the subsequent growth of affected tissue possibly left *in situ*.

We do not propose to discuss any of the other interesting features of the paper by Wood and Wilkie; all surgeons dealing with rectal cancer should study the paper, for they will find much in it to stimulate their interest in the anatomical and pathological aspects of the subject. For the general reader the message is one of the need for early diagnosis and of hope for the patient, even when removal is undertaken in the presence of considerable glandular enlargement.

Current Comment.

NORMAL BLOOD PRESSURE.

NOTWITHSTANDING the fact that many books, many more articles and vast arrays of actuarial statistics have been published on normal blood pressure, there is daily evidence that misconceptions abound in regard to the value and application of the readings of the sphygmomanometer. The systolic pressure is frequently given a greater significance than the diastolic, hypotension is seriously inscribed as a diagnosis, and the commission of minor errors in sphygmomanometric technique is the rule rather than the exception. These and many further important considerations are discussed by Wing Commander H. A. Treadgold[1] in his summary of the blood pressure findings in the very large number of Royal Air Force pilots and recruits who annually pass through his hands and through those of his colleagues. His valuable contribution begins, as it should, by an emphasis on the precautions: first, that the patient should be stripped to the waist and should lean back comfortably in a chair; and secondly, that the cuff, which must be of the standard twelve centimetre width, should be carefully bandaged in position so that the lower border is five centimetres above the elbow. He insists that the instrument itself should be of the mercury U-tube type; with this we are in agreement.

It is beside the present purpose to discuss the auscultatory phenomena associated with the estimation of blood pressure. In this country a fairly uniform procedure is followed whereby the diastolic figure is taken as the commencement of the fourth phase, whereat the sounds change suddenly from loud and clear and become dull and muffled. Treadgold, in his paper, draws attention to the periodic variation in the exact systolic point with respiration, sinus arrhythmia or deficient vasomotor control, and he takes the first clear sound as the systolic point. He justly emphasizes the great importance of insuring that the stethoscope end exactly covers the brachial artery.

The first influence on blood pressure discussed by Treadgold is that of age. His figures are chiefly derived from examination of the healthy young male adult, and he confirms the fact that the systolic and diastolic pressures do not vary between the ages of eighteen and forty years. The readings for 2,497 "fit" pilots in 1932 within this age period hardly differed from 124 millimetres systolic and 77 millimetres diastolic. Treadgold quotes Symond's analysis of 150,000 American lives which gave 125 millimetres for the systolic and 83 for the diastolic

[1] *The Lancet*, April 8, 1933, page 733.

pressure as the average between the years thirty-five and thirty-nine, and he gives Symond's further opinion that the rise to 135 millimetres systolic pressure by the age of sixty is due to the wide distribution of cardio-vascular disease at this age rather than to the accumulation of years alone. In support of this Donnison found the systolic pressure of 1,000 African natives, who are notoriously free from cardio-vascular disease, to be only 106 millimetres at the later period of life. The old rule of age *plus* 100 as a normal systolic pressure is still too widely relied upon. If some such absolute measure is still required, a better one is suggested in a leading article in the same journal, to which Treadgold has contributed his conclusions. It consists of the addition of one-fourth of the age in years to 120 millimetres up to the age of 60, when 135 millimetres may be accepted as the normal, after which one millimetre should be added for each additional year.

Treadgold next deals with height, weight and body build in relation to blood pressure. He proves that height has no influence, provided it is proportional to weight, that is, that the body build is normal. When weight is disproportionately great, the pressure increases slightly, especially the systolic pressure. He shows further that in regard to cardio-vascular efficiency pressures vary directly with the pulse rate. The diastolic pressure is unchanged while the pulse rate is under 100, but the systolic pressure increases steadily throughout. The standard of cardio-vascular efficiency taken is that set by the Royal Air Force pulse response and 40 millimetre tests, which are somewhat exacting. In 220 young men with cardio-vascular inefficiency the average figures were 139/79, as against 131/78 in 1,036 whose cardio-vascular system was efficient. The inefficient group contained a higher proportion of underweight persons. One of the most striking effects observed was that of emotion. This is best indicated by the statement that the average pressures of 1,036 fit candidates for admission (and therefore under some nervous strain at the time of examination) were 131/78 as compared with the average of 124/77 millimetres for the serving officer. It is to be noted that the effect is almost entirely shown in the systolic figure. Hence it has become the practice at the Royal Air Force Board in recent years almost to disregard systolic pressures in young candidates, provided that the diastolic pressure was below 80 and the cardio-vascular efficiency good. Ten estimations are made in all of the pressures of each candidate at intervals during and after the medical examination. Writing of the endocrine factor, Treadgold concludes that apart from the thyreoid and, in moments of great excitement, the adrenals, there is singularly little clinical evidence that ductless glands play an important rôle in the blood pressure of healthy adults. He found an undue percentage of men with cardio-vascular inefficiency and slightly raised pressure among a group of 98 functional albuminurics, and 79 persons with glycosuria associated with the renal or lag types of glycosuria.

With regard to climate, moderately warm countries apparently have little effect, while the very trying tropical zones cause a definite fall in blood pressure values as a whole. This comprehensive article includes further an analysis of 195 instances of hypotension, with average levels of 121/75 millimetres of mercury. Owing to the high coincidence of an emotional factor, the probability of any particular person being normally hypotensive must be gauged largely in the diastolic pressure. There are two classes of hypotensives: the functionally efficient and the inefficient. It has been inadequately realized that the former class is by no means inconsiderable, and it is important to realize that hypotension below 100 millimetres of mercury can and frequently does coexist with a high degree of physical efficiency. The inference as to the caution which must be used in associating hypotension with a concomitant illness is obvious. Treadgold displays his wisdom in preferring the term "raised blood pressure" to "hypertension" for persons having a blood pressure reading of 140/90 millimetres of mercury and over. This class constituted 6% of his fit pilots. Their characteristics were a tendency to overweight and a poorer cardio-vascular efficiency. He considers that the tendency to either hypotension or hypertension is probably a constitutional one; and this tendency becomes manifest or exaggerated only with such factors as obesity or toxæmia, which would have much less effect on persons not so predisposed. Treadgold finally emphasizes the importance of knowing the exact pulse pressure. He stresses the fundamental principle that while relatively high pulse pressures and a low systolic pressure may coexist with perfect health, small pulse pressures with a normal or raised diastolic pressure require the closest investigation for further evidences of disease. The value of this article to those assessing life assurance risk cannot be overstated. It is essential for everyone periodically to correct their standards of normal values in clinical medicine against the standards of those who have the opportunity of collecting and examining large numbers of such figures.

DIABETIC LIPÆMIA.

LARGELY owing to difficulties of technique, estimations of the fat content of the blood are comparatively seldom undertaken, and the study of the blood fats has been given less attention than it deserves. Little is known about the causes of excessive increase in the blood fat content, as well as the fluctuations during health and the source from which the blood fat in various disorders is derived. A comparatively simple volumetric method for the estimation of the blood fat content has been introduced by Rückert; it should be a means of adding greatly to the knowledge of lipæmia. Douglas H. Collins has recently carried out an investigation of the fat metabolism in *diabetes mellitus*. In a paper recording his results he

describes and discusses Rückert's method.[1] The instrument used has been termed a "hæmolipokrit" or "hæmolipocrite". This is a glass tube with two bulbous dilatations, the smaller below. Above the dilatations the tube is fine and is graduated in hundredths. The capacity of the lower to the upper dilatation and to the graduated portion of the tube is as 25 to 125 to 1. The bore of the graduated portion bears a constant relation to the length; the actual measurements are apparently of no great importance. The method depends on the fact that: "Hydrolysis of the proteins, causing their change from a colloidal state to a state of molecular dispersion, is effected by concentrated sulphuric acid"; the liberation of fats is thus made possible. The quantity of fats can be measured after centrifugation. The lower ampulla is filled with serum. The diluent, which consists of aniline yellow dissolved in amyl alcohol, and methylene blue dissolved in 70% sulphuric acid, is drawn up to the fiftieth graduation on the fine part of the tube; then, after a thorough mixing, it is drawn up to the topmost mark. The tube is then closed at either end and, after incubation at 37° C. for twenty-one to twenty-four hours, centrifuged. The supernatant fat is stained by the aniline yellow, and the serum is coloured blue; a reading of the volume of fat is then easy. Each small division represents a measurement of 0·04%.

Collins found that if four estimations with the hæmolipocrite were made of the fat in any given serum, the greatest variation from the mean result was less than 3%. The results obtained by gravimetric methods were compared with those obtained with the hæmolipocrite; the ratio of fat volume in cubic centimetres *per centum* to fat weight in grammes per hundred cubic centimetres was 1·160:1·0 as a minimum and 1·280:1·0 as a maximum. Collins points out that there is no reason why there should be a constant ratio, as the proportions of different fatty constituents (each with a different specific gravity) may vary considerably.

Collins found that the normal serum fat content was about 0·566% for males and 0·588% for females, the average for both sexes being 0·571%. In comparatively mild diabetes the average for males was 0·948% and for females 0·805%. The highest reading in the series was 1·48%; the patient was receiving insulin, his blood sugar content was only 98 milligrammes per 100 cubic centimetres, and he was passing sugar and ketones in the urine. The lowest reading was 0·26%; the patient was suffering from hyperthyreoidism. The patients passing glucose in the urine had a higher serum fat content than those whose urine was sugar-free; patients passing ketones in the urine had a higher serum fat content than others. Collins found that there was no parallelism between the blood sugar content and serum fat content, and that the fluctuations in the serum fat content were less than in the blood sugar content in any individual case; in this he confirmed the findings of several other workers.

[1] *The Quarterly Journal of Medicine*, April, 1933.

Collins believes that "the lipæmia of diabetes is solely dependent on the inhibition of carbohydrate metabolism". Lipæmia is not due to faulty metabolism of fat; it has been shown that the diabetic is capable of utilizing the fat taken in his food. In diabetes the body is unable to avail itself of sufficient carbohydrate; fat is therefore requisitioned from the tissues to meet calorific requirements. In the more severe cases oxidation of the fats is incomplete; some of their calorific value is lost, and a further supply of fats is demanded. When insulin is given and the carbohydrate metabolism has improved, the quantity of fat required is correspondingly diminished. Collins does not venture to discuss the aphorism: "Fat is burned in the fire of carbohydrate"; he mentions that there may be incomplete oxidation of the fats, but he does not express an opinion on the cause, and he makes no argument for or against the vogue of giving a diet comparatively rich in carbohydrate. Obviously there is still a great deal to be learnt about the metabolism of fats. Until more is learnt there may be a reasonable doubt in the minds of some medical practitioners concerning the wisdom in a rigid maintenance of a conventional ketogenic-antiketogenic ratio in diabetic diet. The volumetric method of the estimation of the serum fat content should be simple enough to anyone at all skilled in hæmatological technique. It is to be hoped that it will be made use of in a series of careful investigations of the blood in health and disease. So little is known that the slightest information gained will be of value; any considerable amount of information may greatly modify or even revolutionize present views on diet and many aspects of metabolism.

"EPIVAN."

A REPORT has recently been issued by the Anæsthetics Committee of the Medical Research Council of the Privy Council of Great Britain on the clinical value of "Epivan". This report has been published in *The British Medical Journal* and in *The Lancet*. "Epivan" is described as a barbiturate anæsthetic. It comes from Germany, from Bayer Products, Limited. It is the sodium salt of N-methyl-C-C-cyclo-hexenyl-methyl barbituric acid. It dissolves freely in water, but the solution is stable for only an hour or two. When used for anæsthesia (it can be used as an hypnotic), it is given intravenously. According to the report of the Anæsthetics Committee, "dosage is determined by the characteristics of the patient and the results noted". Satisfactory results, it is stated, cannot be obtained by the use of a definite scale arranged according to body weight. "An average amount to produce unconsciousness is about three cubic centimetres." This is rather unsatisfactory. What is described as a good method is to make the patient count. The solution is injected at the rate of one cubic centimetre in fifteen seconds. When the patient stops counting through sleep, the amount

that has been injected is noted, and the same amount is further added for a short operation, and twice as much for a long operation. "Generally speaking, ten cubic centimetres are regarded as the maximum dose." When "Epivan" is to be used for a longish operation the needle must be left *in situ* so that a second series of injections may be given when the effect of the first is wearing off. The conclusion of the Anæsthetics Committee is quite definite: "Epivan" is not to be regarded as a basal narcotic in the sense that, for example, "Nembutal" and "Avertin" are.

Its action is so evanescent that it cannot be employed as are these drugs for procuring a longish period of quiet or of unconsciousness before the administration of the anæsthetic proper, nor can it be used, as are these basal narcotics, to put the patient to sleep in his bed in order to avoid all knowledge of transference to the operating theatre.

Already a report of the use of "Epivan" in one hundred cases has been made by Ronald Jarman and A. Lawrence Abel.[1] The operations performed by them and the dosage used were as follows: Minor operations on out-patients, 8 cases, dose, 2 to 3 cubic centimetres; œsophagoscopy and bronchoscopy, 14 cases, dose 7 to 11 cubic centimetres; cystoscopy *et cetera*, 5 cases, dose 10 to 11 cubic centimetres; rectal operations, 29 cases, dose, 10 to 11 cubic centimetres (in one case gas and oxygen had to be used in addition); gynæcological procedures, 5 cases, dose 7 to 10 cubic centimetres; intraoral operations, 15 cases, dose, 5 to 11 cubic centimetres; partial mammectomy, 4 cases, dose, 10 to 11 cubic centimetres; laparotomies, 7 cases, dose, 11 cubic centimetres; bilateral herniotomy (two administrations), 2 cases; empyema drainage, 1 case, dose, 11 cubic centimetres; miscellaneous operations, 10 cases.

This list of operations covers a wide field. Jarman and Abel have apparently gone further than is advised by the Anæsthetics Committee of the Medical Research Council. They point out, however, that for short major operations they have found it necessary to use preliminary injections of "Omnopon" and scopolamine. When they have injected two or three cubic centimetres for a minor operation, the patient has been conscious in four or five minutes, and fifteen minutes later has put on his clothes and walked home. It is probably in minor procedures that this drug will be found useful. We agree with Jarman and Abel that before the drug has been more widely used, it should be given only by expert anæsthetists.

CONTRACEPTION IN CHINA.

An interesting investigation has been made regarding family limitation among educated married Chinese women. The investigation was made by Herbert D. Lamson, of the University of Shanghai.[2] The study comprised 120 women; the information was collected in 1931 through *questionnaires* prepared by Lamson and sent out by women college students to some of their married friends and relatives. Twelve of the women had graduated from or attended college, 71 possessed middle school education, 13 had not progressed beyond the primary school, 16 had received their training privately, and in eight instances the standard of education was not stated. It was found that the younger women were far readier than the older women to supply the desired information. The average age of the 120 women was about thirty years.

Lamson points out that during the last three or four decades the age for marriage among educated women has increased on the average between three and four years. For all women there was an average of one pregnancy for each 2·5 years of married life. In 56 cases the period of time between each pregnancy averaged 1·93 years. The offspring living at the time of the study constituted 71·14% of all conceptions. As would be expected, the percentage decreased with increasing length of marriage. The 120 women had 447 pregnancies; there were 400 live births and 318 living children. Five women admitted having sought or attempted an abortion; there were eight attempts and four of these were successful. Twenty-four women reported thirty-two miscarriages.

It was found that nine-tenths of the women believe that women should be able to regulate the coming of their children; they would welcome contraceptive information. They held that medical practitioners should possess and disseminate this knowledge. Not more than one woman in six knew anything of modern methods of contraception.

TRANSMISSION OF BACTERIOLOGICAL AND PATHOLOGICAL SPECIMENS BY POST.

The attention of readers is directed to a communication received from the Director-General of the Postmaster-General's Department regarding the transmission of bacteriological and pathological specimens by post, and published in this issue. This is a matter of considerable importance and, since they enjoy the facilities of the Postal Department, medical practitioners should comply with the regulations. Particular attention should be paid to the wrapping and endorsement of articles. Further, the postal service is not available for the transmission of specimens to medical practitioners and veterinary surgeons whose laboratories are not registered. Difficulty has arisen by the transmission of specimens by persons, other than medical or veterinary practitioners, who are ignorant of the regulations. This will be obviated if medical practitioners will do their utmost to prevent patients from sending specimens. If the sending of a specimen by a patient cannot be avoided, the attendant practitioner should give meticulous instruction as to the method of transmission.

[1] *The Lancet*, July 1, 1933.
[2] *The Chinese Medical Journal*, May, 1933.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Acetylcholine.

C. DEJEAN (*La Presse Médicale*, December 24, 1932) describes the action of acetylcholine in ophthalmic migraine. Six patients who suffered from ophthalmic migraine with scintillating scotoma were treated by intramuscular injection of 0·05 or 0·10 gramme of acetylcholine. In each case the eye symptoms were relieved within fifteen minutes, and headache was prevented. The injections were given soon after the onset of the scotoma. When the symptoms recurred, the treatment was repeated. Seven injections were given in one case, with the result that the symptoms did not recur. Similar results were obtained in all patients, the scotoma was relieved and headache prevented. Ophthalmic migraine is said to be due to an angiospasm in the calcarine region; and the action of acetylcholine supports this view.

Dextrose Therapy.

T. L. ALTHAUSEN (*The Journal of the American Medical Association*, April 15, 1933) discusses dextrose therapy in diseases of the liver. Good effects have been observed in acidosis of pregnancy, in subacute yellow atrophy of the liver, arsphenamine injury, mushroom poisoning with *Amantina phalloides*, and delayed chloroform poisoning, when high carbohydrate diet or dextrose has been administered; in chronic hepatic cirrhosis similar results have been reported. A high carbohydrate diet gives abundant glycogen in the liver and *vice versa*. With low glycogen content the liver loses its power of detoxication against chloroform, phosphorus, carbon tetrachloride and arsenic, as well as against many endogenous and exogenous toxins, cresols, phenols, salicylates, camphor and morphine included. Liver damage is quickly repaired, and coagulation time is prolonged in jaundice by dextrose therapy. It appears that the low glycogen content of the liver in hepatic disease is not due to inability of the liver to form glycogen, but to abnormally slow production of new glycogen from non-carbohydrate sources. The blood sugar is low in hepatic disease. Administration of dextrose favours the formation of glycogen, even when the liver is damaged. Glycogen varies widely in amount in the normal liver, and a regular daily cycle in the level of hepatic glycogen has been described. Dextrose therapy is indicated in all primary and secondary varieties of hepatic insufficiency. The liver loses half its glycogen after one hour of ether anæsthesia. Comparison was made between the livers of patients who were not specially treated and those who were given dextrose before operation, when subacute or chronic liver involvement was present. A small piece of liver was removed at the time of operation and examined microscopically. Where dextrose had been administered, a high glycogen content was noted; in the other patients the liver was almost devoid of glycogen. The intravenous use of dextrose was not more efficacious than oral administration, though the former was valuable in emergency. In acute yellow atrophy and multiple liver abscess up to 500 grammes of dextrose had been given daily for five days intravenously; 500 to 1,000 cubic centimetres of a 10% solution could be given twice a day. As a routine in hepatic disease, or before operation when the liver is damaged, a high carbohydrate diet should be given with additional feedings of 50 to 100 grammes of dextrose in fruit juices three times a day. When the oral route is not available for any reason, the intravenous method should be used; the last part of the intravenous injection should be given very slowly, since abrupt cessation after prolonged sugar administration might give rise to hypoglycæmia, owing to the high insulin output from the pancreas, which responds to glucose injection in this way.

Treatment of Syphilis.

F. LESSER (*Deutsche Medizinische Wochenschrift*, May 19, 1933) finds that 92% of fresh syphilitic infections are cured, not only the primary infections, but when the Wassermann reaction is positive and when a secondary rash has occurred. The course of high "Salvarsan" dosage is carried out till the Wassermann test yields no reaction, and then three further injections are given for safety. Blood tests should be carried out every two months for the first six months, thence every three months. Relapses, if they occur, take place within the first three months after a course of treatment, especially if a pure course of "Salvarsan" has been given. With bismuth injections the recurrence is longer delayed. After two years of repeated failure to react to the Wassermann test, the patient can be considered as cured. In the first four months after infection the occurrence of a pathological cerebrospinal fluid is very rare, and will become normal with treatment. Chronic intermittent treatment is necessary for those patients who give a repeatedly positive Wassermann reaction. The serology of syphilis is so far developed that the Wassermann test can be regarded as a reliable criterion for individual treatment.

Galactose in the Treatment of Diabetes.

J. FREUND (*Deutsche Medizinische Wochenschrift*, February 24, 1933) states that Kosterlitz and Roe and Schwarzmann found that galactose was better used by the diabetic than dextrose. L. Pollak recorded that there was no diminution of the specific galactose tolerance by the diabetic. The author investigated thirteen cases of diabetes by giving the patients 40 grammes of galactose in 350 cubic centimetres of water and estimating the output in the urine. It was concluded that galactose as well as lævulose is used by the diabetic as a sweet substance. Lævulose in all cases but one was better assimilated than galactose. Lævulose tolerance is greater than dextrose tolerance in diabetics. The polysaccharide inulin is still better assimilated by diabetics.

"Theelin" in Ovarian Insufficiency.

A. A. WERNER AND W. D. COLLIER (*The Journal of the American Medical Association*, March 4, 1933) describe the effect of "Theelin" injections on the castrated woman. A potent hormone has been isolated from the ovarian follicles, *corpus luteum*, placenta and blood of pregnant women, and Doisy was able to isolate this hormone from the urine of pregnant women in crystalline form. E. Allen produced menstruation in eight monkeys from which the ovaries had been removed, by the injection of follicular and placental extracts. Four women who had complete bilateral ovariectomy performed and whose uteri were intact, were treated. These patients all had amenorrhœa and atrophy of the breasts and complained of the symptoms of ovarian hypofunction. Four cubic centimetres of "Theelin", equal to 200 rat units, were injected into the gluteal muscles daily for twenty-eight days, six cubic centimetres daily for the next twenty-eight days, and eight cubic centimetres daily for a further twenty-eight days. All the patients experienced fullness of the breasts and erection of the nipples within ten days. In all patients increased vascularity and dilatation of the cervix was noted; mucous discharge was noted, symptoms similar to those of menstruation, and uterine bleeding occurred. Libido was markedly increased in all except one patient, and symptoms of ovarian hypofunction were relieved. The only untoward symptoms were a sensation of burning at the site of injection when the larger doses were injected, and on two occasions an induration which gradually disappeared.

"Cortin" and Adrenal Insufficiency.

J. H. ROBBINS (*The Journal of the American Medical Association*, March 4, 1933) describes the use of "Cortin" in a case of hyposuprarenalism as a sequela of an acute streptococcal infection of the throat. A woman, aged twenty-five years, developed a sore throat with symptoms of malaise; membrane and ulcers appeared on the tonsils, from which numerous streptococci were isolated. Prostration was profound, and after three days the systolic blood pressure fell to 55 and the diastolic pressure to 35 millimetres of mercury. This condition was not influenced by repeated hypodermic injections of one in 1,000 adrenaline hydrochloride. Five cubic

centimetres of "Cortin" were then injected subcutaneously every six hours for twenty-four hours, and twice in the next twenty-four hours. The blood pressure figures after the second dose of "Cortin" were 110 and 70 millimetres of mercury; the general symptoms improved and a rapid recovery was observed. A polymorphonuclear leucocytosis was noted on the third and fourth days of illness. It is suggested that this patient suffered from hyposuprarenalism and that "Cortin" relieved the condition.

NEUROLOGY AND PSYCHIATRY.

The Histological Lesions in Dementia Paralytica.

FREDERIC WERTHAM (*American Journal of Psychiatry*, January, 1933) has produced histological evidence which conflicts with the alleged specificity of the histological lesions in *dementia paralytica*. Apart from the discovery of the actual spirochætes in the brain substance of the paretic, the cardinal histological criteria were the finding of: (i) infiltration of small blood vessels with plasma cells; (ii) the proliferation of Hortega cells, with the development of typical rod cells; and (iii) deposits of iron pigment in adventitial cells in the intra-adventitial spaces of blood vessels, and in Hortega cells. The author claims to have found identical histological lesions in the brains of chickens not infected with syphilis. He therefore regards these changes in the human subject as a general reaction of the brain to infection and not as a specific reaction to the *Spirochæta pallida*.

Schizophrenia in Children.

HOWARD W. POTTER (*American Journal of Psychiatry*, May, 1933) claims that in investigating the schizophrenic tendencies in children due consideration must be given to the facilities which children possess for expressing any form of psychopathology, and that the level of intellectual development and the life experiences of the child are limited in comparison to those of the adult. Children are essentially creatures of feeling and behaviour. Regression is just as fundamental a feature of schizophrenia in children as it is in adults. Schizophrenia, a reaction type rather than a disease entity, is characterized by a withdrawal of interests from the environment, abnormal thinking, feeling and acting; disturbances of thought manifested through incoherence, perseveration, mutism; defect in emotional *rapport*; diminution or distortion of affect, and alterations of behaviour. The author reports six patients with juvenile schizophrenia, aged four, six, ten, eleven, eleven and twelve years respectively. Five showed none of the physical signs of puberty. He claims that a quite typical schizophrenic reaction may become manifest long before the beginning of pubescence. The outstanding symptoms of this disorder in young children are found in the sphere of behaviour and a consistent lack of emotional *rapport*. The delusional formation is simple and naïve, due to lack of experience and the stage of intellectual development. There is no normal attempt to become adapted to the environment. Occasionally such children manifest traces of projected narcissism and homo-eroticism. The author notes a superficial resemblance between such schizophrenic children and certain so-called unstable mental defectives. The schizophrenic child often appears mentally defective because his whole interest is centred on himself, and he shows but little interest in the surroundings. Treatment of such children does not seem hopeful.

Encephalographic Studies in Dementia Præcox.

MATTHEW T. MOORE, DAVID NATHAN, ANNIE R. ELLIOTT AND CHARLES LAUBACH (*American Journal of Psychiatry*, January, 1933) present an encephalographic study of sixty cases of *dementia præcox*, and fail to find a normal cerebral pattern. They claim that in such patients encephalography is a safe procedure. Measurement of the cerebro-spinal fluid pressure showed a normal or high figure, and the amount of fluid withdrawn was taken to indicate varying degrees of cortical atrophy with enlargement of the ventricular system and cisternæ. This hydrocephalus was marked in twenty-five of the cases. The only other constant finding was a "selective atrophy involving the parietal lobes and the insula of Reil area". In endeavouring to correlate the X ray findings with the clinical state, it was found that the degree of parietal atrophy appeared to reflect the extent of mental deterioration.

Delayed Mental Disorders Following Cranial Traumatism.

ALFRED GORDON (*The Journal of Nervous and Mental Disease*, March, 1933) presents eleven case histories of patients who, subsequent to some cranial trauma, but in the absence of gross neurological signs, became psychotic. These later mental manifestations developed some months or even years after the original head injury. The part played by such injury in the production of the psychosis is investigated. The subject has a medico-legal importance, and it is shown that old cranial injuries cannot be ignored in the appraisal of psychotic manifestations. It is not found that these injuries play a precipitating part, but that they find a place together with personality trends, constitutional factors, intrapsychic conflicts and other psychogenic disturbances in the ætiology of the post-traumatic mental state. Head injury, although followed by no gross organic neurological sequelæ, appears to cause molecular changes in the cerebral cortex, and therefore can never be dismissed from a just assessment of factors entering into a subsequent psychosis.

Neurological and Psychiatrical Examination of Boxers.

E. JOHL AND E. GUTTMAN (*Münchener Medizinische Wochenschrift*, April 14, 1933) found that boxers after a knock-out punch often suffered from retrograde amnesia for a certain time, although they carried out their actions in an orderly way. A true knock-out is not as harmless as is usually thought in boxing circles; for during the first twenty-four hours the most varied symptoms are found: temporary eye muscle paralyses, severe headache, disturbance of speech (bulbar type), temporary disturbance of memory. These disturbances occasionally last a long time, and the authors have seen a dyskinesia of the duodenum with icterus. Cerebral hæmorrhage from a middle meningeal artery rupture is rare. The loss of consciousness resulting from a knock-out is distinguished from concussion mainly by the transitoriness of the symptoms and by the absence of sequelæ; the only exceptions are when it is complicated by a fall out of the ring or on to a poorly padded floor. In older boxers the authors commonly found permanent changes in the central nervous system, organic changes in the brain, shown by dulness or dementia, and by examination, focal disturbances, difference in reflexes and incoordination and in speech.

Mental Symptoms Associated with Cerebral Tumours.

LOUIS MINSKI (*Journal of Neurology and Psychopathology*, April, 1933) presents his study of the mental symptoms associated with fifty-eight cases of cerebral tumour, the majority of which had been localized more or less accurately by a consideration of the accompanying physical signs. Papilloedema was present in thirty-five patients of this series. The writer observes that mental symptoms most commonly occur in connexion with tumours involving the cortex and very infrequently in those having a subtentorial location. Psychopathological symptoms vary in type according to the rate of tumour growth. In general the rapidly growing neoplasms are associated with changes in the intellectual sphere principally, while changes in personality predominate in the slower growing varieties. States of clouded consciousness and confusion tend to accompany the tumours of very rapid growth. In the majority of those cases under consideration in which the mental reactions simulated the functional psychoses, there was a marked absence of the physical neurological signs. It would appear also that mental symptoms more often arise in association with tumours on the left than on the right side of the brain.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the Waite Agricultural Institute, University of Adelaide, on May 6, 1933.

Pasture Turves.

MR. H. C. TRUMBLE gave a demonstration of pasture turves, supported by photographs and graphical figures, illustrating the trend of seeded pasture investigations in progress at the Waite Institute and various country centres.

Attention was drawn to two perennial grasses, *Phalaris tuberosa* and New Zealand certified perennial rye-grass, which have proved successful for permanent pastures in the Mount Lofty Ranges, south-east, and better class cereal country. The increased productivity of these types compared with natural pastures, and the rôle of annual legumes in maintaining nitrogen content of the soil at a level suitable for the development of sown grasses were stressed.

Seedlings and Ultra-Violet Light.

DR. I. F. PHIPPS demonstrated the behaviour of various grass and clover seedlings in the presence of ultra-violet light. He said that in the case of certain *Lolium* species, the seeds of which were indistinguishable prior to germination, the radicle of annual forms exuded a fluorescent substance when in contact with filter paper, whereas the perennial forms were non-fluorescent. The test was thus of value in distinguishing between annual and perennial types.

Entomological Problems.

DR. J. DAVIDSON dealt with the following entomological problems:

Sminthurus viridis L. (lucerne flea). He gave a brief account of the experimental work carried out on the lucerne flea, with particular reference to the influence of rainfall, saturation deficiency, temperature and soil type on its seasonal occurrence and range of distribution in Australia.

Thrips imaginis (apple thrips). He gave a brief account of the experimental work carried out on apple thrip, with special reference to the factors affecting its occurrence in plague numbers in Australia in certain years.

MR. G. SAMUEL gave the following demonstrations with two plant viruses, tobacco mosaic and tomato spotted wilt: (i) Inoculating methods. The smallest wounds, such as those made by merely breaking the hairs on a leaf, were much more favourable points of entry for the virus than were needle scratches or injections with a hypodermic syringe. (ii) The primary lesions formed at the points of entry of the viruses on the flat surface of tobacco leaves. These were very numerous with a concentrated virus, and by comparing two viruses on opposite halves of the same leaves and adopting a statistical treatment, fairly accurate quantitative work could be done. (iii) Curves showing the inactivation rate of the virus of tomato spotted wilt, obtained with the above methods by Mr. J. G. Bald. This virus usually became inactive after about three hours at room temperature, the inactivation curve being of logarithmic form. Inactivation was hastened by dribbling oxygen through the inoculum, and greatly slowed down (to as much as thirty-six hours for complete inactivation) by the addition of sodium sulphite.

Soil Surveys.

MR. J. K. TAYLOR gave a brief description of the nature of soil surveys, illustrated by an example of a large scale survey of the hundred of Laffer, one of a detailed investigation on the Cadell Irrigation Area.

The type of information collected and the main soil problems, for example, salinity, of these areas were discussed. Quarter scale profile reproductions of a few typical soils were exhibited.

MR. T. J. MARSHALL gave a description of the international method for the mechanical analysis of soils, with a demonstration of the various steps in the process and apparatus employed. The four soil fractions separated by this method, namely, coarse sand, fine sand, silt and clay, were defined, and their significance in the constitution of a soil commented on. The importance of mechanical analysis as an aid to soil surveying was briefly discussed.

MISS P. M. ROUNTREE exhibited cultures and microscopic preparations of a soil bacterium which oxidizes elementary sulphur to sulphuric acid. By the agency of this organism a member of the Thio bacillus group, a sulphur-treated alkaline soil from Renmark (Renmark clay loam) has its pH value changed from 8·4 to 4·5 in twelve days.

Graphs were shown to illustrate the rate of sulphur oxidation in unsterilized soil and in sterilized soil inoculated with a culture of the organism, the rate of growth of the organism in inoculated soil, and the effect on the rate of oxidation of varying soil moisture and soil temperature. The optimum moisture content falls between 60% and 90% saturation, and the optimum temperature between 16° and 35° C.

Public Health.

TRANSMISSION OF BACTERIOLOGICAL AND PATHOLOGICAL SPECIMENS BY POST.

THE Director-General of the Postmaster-General's Department of the Commonwealth has written concerning the transmission by post of bacteriological and pathological specimens. He points out that while the members of the medical and veterinary professions have in the past cooperated with the department, evidence of laxity has become apparent.

The following conditions as to packing and posting must be observed in respect of all bacteriological or pathological specimens sent by post to an address within the Commonwealth:

(1) The specimens are eligible for transmission by post only when they are packed in accordance with the conditions stipulated by the department and only when they are addressed to a laboratory which has been registered by the Postmaster-General.

(2) The transmission by post of specimens to doctors and veterinary surgeons whose laboratories are not registered is prohibited.

(3) Applications for registration by the Postmaster-General of laboratories to which bacteriological or pathological specimens may be sent for examination must be made on the proper form, copies of which may be obtained from a Deputy Director, Posts and Telegraphs.

(4) The liquid or substance forwarded for examination must be enclosed in a suitable receptacle, hermetically sealed or other securely closed. The receptacle must itself be placed in a strong wooden or metal case in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton wool) so packed about the receptacle as absolutely to prevent any possible leakage from the package in the event of damage to the receptacle. The lid of the box must be fixed in such a manner that it cannot easily become detached.

(5) The package must be endorsed "Specimen for medical examination—Packed as prescribed", and must be sent by registered post, except in the circumstances mentioned in paragraphs (6) and (7). Specimens are not transmissible by parcels post in any circumstances.

(6) In the case of throat swabs which are not obtained in time to enable the specimen to be forwarded the same day by registered post, such specimens may be transmitted by ordinary post, provided they are properly packed in accordance with paragraph (4), and the article bears an additional endorsement

indicating that the specimen was obtained too late to permit of it being forwarded by registered post.

(7) Any specimen posted by a duly qualified medical practitioner or veterinary surgeon may be sent by ordinary post, provided the rules as to packing are rigidly adhered to and the endorsement on the cover of the article is signed by the sender. The usual abbreviation indicating that the sender is a qualified medical practitioner or veterinary surgeon must also be given.

In the case of specimens addressed to places beyond the Commonwealth, except as provided in the latter portion of this paragraph, they are transmissible by post only if rendered harmless by their mode of preparation and packing. Registration is not essential. Pathological specimens addressed to the General Superintendent, Imperial Cancer Research Fund, London, and sent by duly qualified medical practitioners or veterinary surgeons or by recognized pathological or related scientific laboratories, may, if securely packed in tubes enclosed in wooden cases, be forwarded by unregistered sample or letter post.

Any person who sends by post bacteriological or pathological specimens otherwise than in accordance with the conditions governing the transmission of such articles shall be guilty of an offence. Penalty, fifty pounds.

Obituary.

CHARLES HENRY MAHER.

DR. CHARLES HENRY MAHER, whose death has already been recorded in this journal, was born in 1855. He started his education in Sydney, and after graduating as Bachelor of Arts at the University of Sydney in 1876, went to study medicine in Dublin. He became a licentiate in 1883 and a licentiate in midwifery in 1884 of the King and Queen's College of Physicians of Ireland. In 1884 he was admitted as a member of the Royal College of Surgeons of England. He returned almost at once to Sydney and started practice. In 1888 he was appointed honorary physician to Saint Vincent's Hospital; at the time of his death he was honorary consulting physician. He was also associated with the Sacred Heart Hospice from the time of its foundation until a year before he died.

"One of His Old Colleagues" writes:

There are always some among us who pass through life with no fame beyond a narrow circle of close friends or colleagues. They are often of those who persistently hide their light under a bushel and who fail to dress their window, even in a righteous manner. Their profession only has a bowing acquaintance with their work or personality, and the general public rarely ever hears their name. Of such was Charles Maher.

A native of New South Wales, educated here, and an arts graduate of the Sydney University, he decided to study medicine, and, with his distinguished brother, the late W. Odillo Maher, one of the pioneers of ophthalmic practice in Australia, he went home and took his diplomas. Returning to Sydney, he was quite early appointed to the honorary staff of Saint Vincent's Hospital, and remained on it till his death recently as senior consulting physician.

During these long years of usefulness he was perhaps the most constant and assiduous member of a hospital staff that the writer of these notes has ever known. Early or late, long or short hours, it was all the same to this member of the staff. He gave, indeed, his best always to the institution he served. I do not think he could ever have been a successful private practitioner, either in general or consulting work. He had all the knowledge to shine in either branch of work, but temperamentally he was, I fear, not fitted to attract a large practice, nor had he the assured manner, push, and general acquaintanceship with practitioners which would have brought him consulting work. He for many years did the pathological work at this hospital, and also acquired a considerable special knowledge and skill in diseases of the throat. I should describe him as a very fine all-round clinical physician of the type which adorned the profession forty or fifty years ago. I can recall few men who were as perfect in physical signs as he was, and who could sum up so well all the possibilities of a difficult diagnosis. It was at this point that he showed what I must admit was a weakness. He saw too many sides to the question, and hesitated over the final diagnosis. To be successful in medicine it is better to emulate the Georgian Lord Chancellor whose swift decisions, even if sometimes wrong, were preferred by the public to the tardy correctness of his immediate predecessors in that high office. He was very wise, and often very modern in his treatment, but the distressing thing with Maher was that after a course of treatment and therapy had been agreed upon, he allowed himself to be haunted by doubts and made himself wretched by continually imagining that the best had not been done. These shortcomings were just the outward expression of his supersensitive mental make-up. He shrank from publicity, he seldom went to medical gatherings, and I can recall very few occasions, if any, on which he either spoke or read a paper. His attitude of unjustified self-depreciation stood ever at the back of his well-stored mind and wide experience. It fretted us, his friends, that this should be so, for he possessed many talents and much learning. He was indeed a learned physician, not only in the actual knowledge of his profession, but in classics, general literature and history. His common talk to his intimates was stored with information. He had a strong affection for the country—pastoral things were intimate matters—and he developed a delightful interest in, and knowledge of, birds and beasts of the bush. I think he would have made quite a happy squatter of a past generation.

I shall say nothing of Dr. Maher's connexion with the Australasian Trained Nurses' Association, but I must refer to his long service within the walls of the Hospice of the Sacred Heart, nursed by the same Sisters who have charge of Saint Vincent's. In that home where, for so many years, not a few who have fallen by the wayside, and whose troubles are immedicable, have found, if not healing, at least kindness and alleviation, he worked with quiet faithfulness. To them Maher must have been a true disciple of Saint Luke. I can think of no other single member of our profession here who has given so many years' service and so many hours of devotion to that class of hopeless invalid which is not very attractive to a doctor, for with such cases no cures are to be expected. All honour to him, then, that he took charge of them and gave them no careless perfunctory service. Maher, I do not think, could ever have shone as a teacher of a class of bustling students with examinations to pass—he was too shy, reserved and diffident. But he could, and did sometimes, forget himself, and to two or three, usually students of an older growth, allow them to profit by the stores of experience and medical wisdom which he did most truly possess. He was very often my opposite member on the staff, and we often shared the responsibility of cases. I like to say here how many times his acumen and viewpoint put the right interpretation on some baffling syndrome. Alas! even in such familiar company, it sometimes needed a kind of mental ecbolic to force him to deliver himself. As the years passed and he retired from his active position on the general staff of the hospital, he became still more of a recluse, and we, his friends as well as his relatives, deplored his solitary life and wished he would make it otherwise. But it was his nature, and his ways had crystallized into a sort of kindly detachment from most of his fellow men. It is true, I suppose, that Maher made no material success of his professional career; but he made himself learned in his art. He gave without thought of self all he knew to the service of those whom poverty, misfortune and disease make most dependent on the generosity and skill of men like himself. Those who were privileged to be his close friends and colleagues were fortunate, for here was one who had no personal ends to serve, was utterly honest and truthful, and whom they could admire, respect, and hold in high affection. Such a man was Maher, and with all that I have said—and I have said but little—we who knew him best cannot regard his life as frustrate.

Correspondence.

SHALL THE TONSIL BE OUR TOTEM?

SIR: A pious practitioner of medicine, unfortunately too young to have been a Licentiate of the Society of Apothecaries, I read with wonder and astonishment the assertion made in your journal on August 5 by Dr. Sydney Pern that "nearly the whole world has become infected by the streptococcus, it being passed from parents to children at a very early age . . ." Is this, then, a new discovery on the part of Dr. Sydney Pern and "several diligent workers" of a new species of pox similar to the so-called Gallic pox, which is said to have spread over the then civilized world in post-Columbian days? Or is it something of which the older practitioners have known so well as to have taken for granted? For myself, I certainly learned as a student to know the streptococcus, and to know him as a very subtle bacterium, but not, I am afraid, as this malificent microorganism which Dr. Pern would have us believe is silently white-anting man's glorious anatomy.

Dr. Pern further states that 75% of the diseases to which the flesh of man is heir are due to the streptococci; that these baleful bacteria gain entrance through the tonsils, infect the gums and the sinuses and finally entrench themselves in that bootless bowel, the caecum.

Alas, Sir, that we should so sorely suffer under the streptococci; yet how many sound teeth and timorous tonsils and guiltless gall-bladders have been sacrificed in this heroic endeavour to banish these abominable bugs! I have in mind a host of wretched people who habitually attend my out-patient clinic and who at various times have suffered surgeons to ablate, drain, excise and wash out these so-called culture beds of entrenched streptococci, and still there are the ache in the back of the head, the fullness in the stomach, the pain here and the numb feeling there, the sallow skin, the depressed mind, the furred tongue, and the tremulous hands. And I often wonder whether these miserable people would not have been better off innocently harbouring their sinister streptococci than in hawking their irremediable distress from home to hospital, bereft of teeth, tonsils and gall-bladders, in endless itinerary.

However, Dr. Pern says the remedy against 75% of disease is simple. If there is any doubt about it, he says, take a culture. But the sweeping and dogmatic nature of his remarks seems to suggest that rather than take a culture, he would have us establish a cult.

According to the ancient Mosaic covenant, amputation of the foreskin insured spiritual health. Circumcision became a cult. Dr. Pern enjoins us to believe that removal of the tonsils constitutes a safeguard against disease. In tonsillectomy, he believes, we have a means of ridding the human body of three-quarters of its ailments. Death to the streptococcus means health to the patient. Such naïve simplicity, however, savours of a religious rite, and where Moses made a fetish of the foreskin, it seems to me that Dr. Pern wants to make a totem of the tonsil.

Or is it simply that:

> "All seems infected that th' infected spy,
> As all looks yellow to the jaundic'd eye"?

Yours, etc.,

REG. S. ELLERY.

14, Collins Street,
Melbourne,
August 6, 1933.

"PROFESSIONAL BRETHREN."

SIR: Our good old "B.M.J." complains that only the same limited number of men attend the monthly meetings. Are not many of the members to blame? For many years I practised in a large country centre, and year after year was sent to the annual gatherings of the representatives of the country sub-branches. We were always most hospitably entertained by the leading officials of the society, who went out of the way to make us at home. But with the exception of a few city and suburban men who represented central branches, we met none but country men. Some years ago I came to live in a suburb of Sydney, not to practise, indeed, but retaining all my old interest in the British Medical Association, and anxious to attend the monthly meetings, which previously I had no opportunity of doing. Excepting a few of the older men, who, if approached, were courtesy and kindness itself, I knew none of the younger men. I found that I was ignored. If I made a remark to a member sitting next to me I received a bland stare and a monosyllabic answer. This happened not once, but several times. When I partook of the coffee so kindly provided at the close of the meetings, I found myself treated by the crowd—most of whom were "chummy" with each other—as little better than an intruder. I therefore ceased to attend and never intend to do so again. Could not the men who live in Sydney and chum together at the meetings show a little amicability to those who are evidently alone and know none or few? We call ourselves "professional brethren", but are we?

Yours, etc.,

"OVER FORTY YEARS A MEMBER."

Sydney,
August 8, 1933.

PNEUMONOKONIOSIS.

SIR: In view of discussions and letters recently published, some remarks about the above condition as it occurs at Broken Hill may be of interest.

The Broken Hill ore and country rock are of extremely complex composition, and the percentage of free silica contained in different ores from various parts of the line of lode varies considerably. Probably a fair average of the free silica present would be about 30%, but portions mined would contain much less and others much more than this.

Men placed upon compensation are reexamined at six-monthly intervals, or as often as the medical authority may desire. Thus many cases of pneumonokoniosis have now been reexamined at intervals for up to thirteen years, and opinions have been formed as to the nature and progress of this disease which cannot be gained from isolated examinations of cases of pneumonokoniosis.

In his recent most interesting address on pneumonokoniosis, Dr. W. A. Edwards stated: "This (*Broken Hill Act*) is a very generous act from the workers' point of view, and medically it is very easy to administer. The medical authority has only to satisfy itself that the man has typical radiographic appearances of pneumonokoniosis or is suffering from tuberculosis and he is withdrawn from the industry and put on the compensation list." This is not now correct. In 1929 our act was amended and the words "reasonably attributable to his employment in the Broken Hill mines" were added to the phrase "pneumoconiosis and/or tuberculosis". This placed the certifying authority in much the same position as certifying authorities elsewhere. Incapacity is not necessary for men to be placed upon compensation.

In discussing aspects of pneumonokoniosis, the following will be touched upon, and, as far as diagnosis is concerned, they are here placed in decreasing order of importance: (*a*) the radiograph, (*b*) the industrial history, (*c*) the physical examination, (*d*) symptoms.

The Radiograph.—This must be technically perfect. Probably an imperfect radiograph is the cause of more mistaken diagnoses than any other one factor. The technique as indicated by Dr. Edwards is followed, though 100 milliampères is not exceeded. Fluoroscopy is not used as a routine; cases with doubtful large opacities are, however, screened.

The straightforward case, showing in the radiograph a uniform, symmetrical, discrete mottling, is not difficult to diagnose when this is considered along with the other three factors. The case which presents most difficulty in diagnosis, and over which controversy is apt to arise, is

one in which, due to an old inactive hilar and peribronchial infection (tuberculous) there is an almost generalized increase in the fibrous tissue of the lung. This type of radiograph, which really shows no specific evidence of pneumonokoniosis, if found in a man with a history of exposure to dusty conditions (of whatever nature) is frequently diagnosed as pneumonokoniosis or as pneumonokoniosis and tuberculosis. Actually the radiographic changes present are indicative of an old tuberculous infection only. However, when these changes are more extensive, or are increasing, or have developed under observation in a working miner with long exposure to silica dust, it seems to be reasonable to assume that some slight degree of pneumonokoniosis may be present.

A quite appreciable percentage of cases diagnosed amongst South African miners during life as suffering from "uncomplicated tuberculosis", at *post mortem* have shown macroscopic and microscopic signs of silicosis.

Many cases have been observed amongst Broken Hill miners which, radiographically, were typical of an "uncomplicated tuberculosis" when they first came under notice. After the lapse of a variable time, however, they would just as certainly be placed under the heading "pneumonokoniosis and tuberculosis" by any radiographer. Most unfortunately, no *post mortem* examination is conducted to confirm such a radiographic diagnosis. The facts, however, that these men live so long with such profound changes present in their lungs, and have so few symptoms and so little incapacity, are sufficient to establish that these radiographic changes are not wholly tuberculous.

With regard to "massive consolidations" as opposed to discrete mottling present in the radiographs of pneumonokoniotics, I do not think we err to any great extent if we ascribe their presence as being due to a tuberculous complication. This, in spite of the failure to produce tuberculosis in a few animal inoculation experiments carried out after death with such areas. Many cases of pneumonokoniosis have now been followed from the earliest appearance of such consolidations until death. With the onset and increase in size and numbers of such areas a progressive deterioration in the general condition of the beneficiary and an increase in his symptoms of ill health have been observed. In rapidly progressive cases these changes, of course, are marked, but in the more common chronic type all that may be noted is a slight but progressive loss of weight and the complaint of lassitude after exertion and increasing weakness, symptoms not present previously, though inquired for. Sooner or later, if the patient lives long enough, these consolidations break down and "open" tuberculosis manifests itself. One has seen a very typical case of uncomplicated pneumonokoniosis in two months develop and die from an acute tuberculosis with sputum positive for tubercle bacilli. Most Broken Hill pneumonokoniotics die from pulmonary tuberculosis. For all these reasons it seems quite reasonable to me to regard cases showing massive consolidations as tuberculous from the outset.

In this regard it must be remembered that the term "tuberculosis" is defined in the South African *Compensation Act*, and their term "infective silicosis" has been introduced to describe those cases with massive consolidations whose sputum is negative for tubercle bacilli and whose symptoms are not sufficiently advanced or acute to bring them within the definition. It is quite freely admitted, however, that over 90% of their "infective silicotics" finish up classified as "silicosis and tuberculosis".

In fact, the more one sees of pneumonokoniosis, the more one is satisfied of its intimate association in the human being with pulmonary tuberculosis, either active or quiescent.

The only other point in connexion with the onset of definite tuberculosis in pneumonokoniotics to which it is desired to draw attention is the frequenecy with which this sequela first shows itself in the lower lobes of the lungs.

The Industrial History.—From a consideration of the above the importance of the industrial history of the applicant can be realized, especially in those compensation acts where "uncomplicated tuberculosis" is not compensable. By this I do not mean that all tuberculous infections occurring in men exposed to dust contain a pneumonokoniotic element, but there are certain cases, with long exposures to dust, where there is probably some localized pneumonokoniosis present, although the radiograph may resemble that of a case of uncomplicated tuberculosis.

With the onset of a chronic bilateral upper lobe tuberculous infection in a pneumonokoniotic, the nodules in the basal portions of the lungs tend to be drawn up and clumped in the large upper lobe masses. Thus a case seen for the first time at this stage would show radiographically lower lobes comparatively free from any evidences of pneumonokoniosis, and might be described as "uncomplicated tuberculosis" in the absence of knowledge of the industrial history of the man concerned.

Close inquiry as to the correctness of the industrial history should always be made, and that given should be checked at every possible point. In applicants for compensation there is nearly always a tendency to exaggerate the period of exposure to dusty conditions.

Physical Examination and Symptoms.—Physical examination and symptoms can be considered together. These are of value in endeavouring to estimate the incapacity of the applicant. It can safely be assumed that in compensation cases the symptoms will be proportional to the benefits to be derived under the compensation scheme. Where compensation payments are low, pay is good, and the worker is forced up to a periodic examination, he will depreciate his symptoms, especially if payments cease after a certain sum has been paid. Where compensation payments are large, continue indefinitely, and perhaps the applicant is out of work, symptoms increase. The symptoms complained of have therefore to be carefully assessed, but it must be remembered that genuine symptoms are not proportional to the amount of fibrous change in the lung. The radiographer should therefore not estimate the percentage incapacity for work. Men with marked changes in their lungs can continue at work for a surprisingly long time, but usually when these advanced cases come for examination it is found that they have recently been employed as shift-bosses, timbermen *et cetera*, where the work is skilled rather than laborious.

An attempt to follow another occupation after withdrawal from the mines, for example, farming, is usually followed by a marked increase in symptoms; different muscles are used, and unusual work causes an unaccustomed strain.

Among miners a definite indication of some incapacity is indicated by the man ceasing contract work and going on "wages".

In conclusion, with Dr. Badham, I deplore the small amount of pathological work possible under our present compensation laws, and hope that future legislation will provide for *post mortem* examination of beneficiaries. Thus our clinical and radiographic signs can be correlated with the actual pathological changes present.

Yours, etc.,

WM. E. GEORGE.

Bureau of Medical Inspection,
Department of Labour and Industry,
Broken Hill.
August 11, 1933.

PATHOLOGICAL CONDITIONS OF THE CERVIX UTERI: TOTAL OR SUBTOTAL HYSTERECTOMY.

SIR: Dr. Matters writes in your issue of this day: "the cervical lacerations which may at least in part be missed by the Worrall method." In my letter in the journal of July 8 I stated: "the whole of the vaginal portion of the cervix is removed." Nothing could be more definite than that description, and yet Dr. Matters talks of "lacerations not always excised". May I say just once more that by the Worrall technique the whole uterus, body and cervix is completely removed, except the outer layer of the supravaginal cervical muscularis (*vide* illustrations, *The Journal of the College of Surgeons of Australasia*, July, 1928)?

With regard to cautery and diathermy treatment, there have been a number of references in the journals to the strictures and interferences with normal drainage produced by these agents. It is too soon to look for the cancers which all authorities agree are apt to follow scars produced by burns.

Yours, etc.,
Ralph Worrall.

233, Macquarie Street,
Sydney,
August 12, 1933.

THE PROBLEM OF GASTRIC CARCINOMA.

Sir: It seems a pity that abuse, such a formidable weapon in political controversies, should be creeping in where scientific discussions are concerned.

The writer has been taken to task for using a *nom de plume*. His reason lies in the following. Some time ago a voluminous contributor to medical journals told him that there is nothing like writing papers to compel one to read up tons of literature which otherwise would be left untouched. Besides, added he, "it brings you before the profession".

Since then, and because, to my mind, a communication in a scientific paper should have only one purpose, that is, to make a contribution to scientific knowledge, I am in the habit of leaving it to the discretion of the editor to affix my name or some suitable *nom de plume* to any contribution to the correspondence column. It is the same in the present instance.

In regard to the question of colour reaction tests, may I mention G. A. Harrison's text book on "Chemical Clinical Methods"? He quotes a statement by Professor von Jaksch: "No chemist would consent to draw any conclusion from a reaction so long as he is in complete ignorance of the substance to which it is due. Only the medical man who lacks the necessary chemical training is prepared to do so."

"Innumerable writings are quite worthless, the number of which is directly proportional to the lack of chemical training amongst the investigators in the field."

My sole object of writing this and the previous letter is to warn at least the younger members of the profession that in these days of keen competition one cannot afford to risk one's reputation by basing an opinion on any method of examination unless thoroughly familiar with it, even if, in the hands of others, that method may seem quite simple.

Yours, etc.,
"Pathologist."

August 14, 1933.

THE TONSIL PROBLEM.

Sir: I regret that Dr. Kent Hughes has not answered the question in my letter as I had hoped.

Might I still ask him to state specifically what measures he applies to the various nose sinuses that are found to be diseased in children up to the age of fourteen years, by which he cures their diseased state and in consequence secures with certainty, as he claims, the restoration to normality of diseased tonsils and adenoids.

I am quite open in my mind and, I assure him, will be grateful for his instruction.

Yours, etc.,
Arthur Murphy.

Wickham Terrace,
Brisbane,
August 14, 1933.

Sir: My recent article on tonsils has called forth a certain amount of comment, some of which, I think, should be replied to.

Firstly, Dr. Kent Hughes, in the journal of July 15, 1933, He appears to regard the matter of diathermy or dissection as a debate, and that each side should raise as many arguments as possible, instead of arriving at the best method by reasonable discussion. He quotes Layton: "I never remove a tonsil in a child under eight years of age." A dogmatic statement such as this on a controversial subject indicates that the writer has lost his sense of proportion a little.

I should like to join my voice with that of Dr. Murphy about Dr. Kent Hughes's "astounding statements" and ask him how he cures pansinusitis and polypi by diathermy, how many cases he has treated, and what is his percentage of success.

Dr. Cahill, in the journal of July 1, 1933, quotes some "New Techniques for Tonsillar Electrosurgery". I should like to call his attention to his own letter of June 7, 1930, and to Dr. Garnet Halloran's reply on July 26, 1930, where he points out that the bipolar method was discussed at the medical congress and that expert opinion was against it. In that journal also are Dr. Halloran's cable to Dr. Portman, and the reply, saying he had given up diathermy.

Reference should be also made to Dr. Watkins's letter of June 21, 1930. Dr. Dark, in the issue of June 24, 1933, points out that some of the claims of the ardent diathermists are unfounded, and gives a very fair summary of the advantages and disadvantages of both methods, but he assumes that hæmorrhage is impossible after diathermy—at least his article would lead one to believe that; probably in skilled hands it is much less probable, but where there is sloughing of tissue it must occur and it should be remembered that the diathermy patient is not usually in hospital and is therefore in a far worse position for relief of hæmorrhage than the one who bleeds after dissection.

Yours, etc.,
R. H. Bettington.

"Craignish",
185, Macquarie Street,
Sydney,
August 17, 1933.

THE WEST AFRICAN MEDICAL SERVICE.

Sir: The Registrar of the University of Sydney has passed on to me a letter from Professor K. H. Bailey, of Melbourne University, who has recently received a cable from Major Furse (Colonial Office) reading as follows:

> Limited number of vacancies have unexpectedly occurred for medical officers, West African Medical Staff. Selected candidates would be required to take tropical medicine and hygiene course in this country, commencing 8th January. I am notifying you at once of this new development in the recruiting situation, in case your committee wishes to make any recommendations. If so, they must be received here by 14th October.

I should be glad to know of any young graduates who would be both suitable and available. You will note that the matter is an urgent one.

I enclose the conditions, as far as I know them, of such appointments.

Yours, etc.,
Harvey Sutton,
Director.

School of Public Health and Tropical Medicine,
University of Sydney,
August 16, 1933.

Analytical Department.

"KRUSCHEN SALTS."

"Kruschen Salts" is a product which is made in England. It is described as "a diuretic aperient suitable for persons suffering the pains of rheumatism and gout, and for habitual constipation with inactive liver". In another place on the carton the product is stated to be

"highly valued as a diuretic purgative for stimulating the liver and washing out the kidneys, so necessary in cases of rheumatism and gout, lumbago, eczema *et cetera*". Again, the makers declare that this preparation is "recognized as a solvent for uric acid in the blood which is connected with the occurrence of gout, rheumatism, gouty eczema *et cetera* and of many diseases of the liver and kidneys".

A sample of Kruschen salts has been submitted to analysis by our analyst. The composition as stated on the label is shown in comparison with that found by analysis in the accompanying table.

Substance.	Composition Shown on Label.	Composition Found by Analysis.
Magnesium	11·4490%	10·07%
Sodium	4·5820%	6·63% (by difference)
Potassium	2·9913%	2·62%
Chloride Radicle .	6·5420%	6·55%
Sulphate Radicle .	49·6090%	50·28%
Iodide Radicle ..	0·0007%	Trace (approx. 0·0005%)
Acid citric	1·5000%	1·49%
Water of Constitution	23·3260%	22·36%

The results of analysis show that the preparation is substantially of the composition claimed. Kruschen salts may be looked on as a useful saline aperient and it may be prescribed as such by medical practitioners. The claims of the proprietors as to the value of Kruschen salts in the treatment of various disorders as set out are due to the beneficial action of a saline aperient when one is indicated on clinical grounds. Practical medicine has no clinical or laboratory proof of the existence of any drug or combination of drugs that dissolves uric acid or any other product of disordered metabolism circulating in the blood in gouty or rheumatic conditions.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE following is a list of presidents of the several sections of the Fourth Session of the Australasian Medical Congress (British Medical Association), to be held at Hobart from January 15 to 20, 1934.

Section of Medicine: Dr. C. Bickerton Blackburn (Sydney).
Section of Surgery: Dr. Bronte Smeaton (Adelaide).
Section of Naval, Military and Air Force Medicine and Surgery: Dr. F. A. Maguire (Sydney).
Section of Obstetrics and Gynæcology: Dr. Hugh McLelland (Brisbane).
Section of Ophthalmology: Dr. L. Mitchell (Melbourne).
Section of Oto-Rhino-Laryngology: Dr. H. M. Jay (Adelaide).
Section of Public Health, Preventive Medicine and Tropical Hygiene: Dr. John Dale (Melbourne).
Section of Pædiatrics: Dr. S. F. McDonald (Brisbane).
Section of Radiology: Dr. H. R. Sear (Sydney).
Section of Pathology, Bacteriology and Cancer Research: Dr. J. V. Duhig (Brisbane).
Section of Anæsthetics: Dr. L. Lillies (Melbourne).

Hire of Motor Cars.

The following particulars are supplied for the use and convenience of members of Congress.

Hired Motor Cars.—It has been ascertained that the Congress Committee will be able to obtain the use of at least forty-eight motor cars. All these cars are sedans and seven (7) seaters; and further, should this number be insufficient, arrangements have been made to obtain further cars from Launceston. All charges for hire of motor cars with driver will be made in accordance with a scale laid down by the Government Tourist Bureau. The price generally for car and driver is one shilling and threepence per mile, but set prices are laid down for recognized trips around Hobart and through Tasmania.

Hire and "Drive Yourself" Motor Cars.—A fleet of 35 hire and "drive yourself" motor cars will be available, and comprise 15 sedans and 20 touring cars. In this connexion the following points are to be noted: (*a*) Mileage is charged at the rate of sevenpence per mile up to the first 250 miles and thereafter at the rate of sixpence per mile. (*b*) Hirers are required to supply their own oil and petrol. (*c*) Cars are supplied cleaned, greased, and in first class mechanical order. Cars will be serviced upon return of each journey. (*d*) Every car is insured against accident, and the policy carries a third party risk up to one thousand pounds (£1,000).

Booking of Motor Cars.—As the Executive Committee anticipates that the booking for motor cars will be exceptionally heavy, in view of the fact that the tourist season will be at its height in Tasmania, visitors to the Congress are asked to make their motor car requirements known as soon as possible.

Hotels and Boarding Houses.

The following is a list of hotels and boarding houses in and around Hobart, with the tariff:

Hobart Hotels.

	Tariff. Per Day.	Per Week.
Licensed Houses—		
Hadley's Hotel	21/-	£6/6/-
Heathorn's Hotel	14/-	£4/10/-
Highfield Hotel	14/-	—
Carlton Club	12/-	£4/4/-
Unlicensed Houses—		
Astor	12/6 to 15/-	£4/4/- to £5
Imperial	12/6	£4/4/-
Beach House	11/-	£3/10/-

Boarding Houses.

St. Ives, Montpelier Road	15/-	63/- to 70/-
Aberfeldie, Davey Street	10/-	63/- to 70/-
Hollydene, Campbell Street ..	9/-	63/-
Oriana, Montpelier Road	—	—
Eltham House, Bathurst Street	8/-	55/-
Ashleigh, Davey Street	10/-	63/-
Roseville, New Town	10/-	50/-
Brae Lynden, Battery Point ...	10/-	63/-
Woodbourne, Davey Street ...	8/-	42/-

Country Hotels.

Licensed Houses—
Fern Tree Hotel (6 miles from Hobart).
Australasian, Brown's River (10 miles).
Bush Hotel, New Norfolk (24 miles).

Unlicensed Houses—
Mt. Royal, Brown's River (10 miles).
Spring's Hotel, Mt. Wellington.

NOTICE.

THE following notice is published at the request of the Secretary of the Victorian Branch of the British Medical Association.

The Chief Commissioner of Police in Victoria reports that a woman residing in a southern suburb, who is genuinely suffering from kidney trouble, is an addict to morphine. She has been under treatment by various doctors who have advised operation. For a fortnight she was in a private hospital, but left before an operation could be effected. She has victimized a number of medical practitioners and obtained from them quantities of drugs.

The description of the woman supplied by the Commissioner is as follows: Forty years of age, five feet four inches high, brown hair and eyes, mottled complexion, well built, fairly good appearance and well-spoken.

The report was sent to the Council of the Victorian Branch with a view to "members of the medical profession being warned about this woman before she can do herself further harm".

The Chief Commissioner of Police would be glad if medical practitioners would advise him of cases that come under their notice so that steps can be taken to protect both the addict and the medical profession.

Books Received.

BLOOD PICTURES: AN INTRODUCTION TO CLINICAL HÆMATOLOGY, by C. Price-Jones, M.B.; Third Edition; 1933. Bristol: John Wright and Sons, Limited. Demy 8vo., pp. 72, with illustrations. Price: 6s. 6d. net.

THE TREATMENT OF RHEUMATOID ARTHRITIS AND SCIATICA, by A. H. Douthwaite, M.D., F.R.C.P.; Second Edition; 1933. London: H. K. Lewis and Co., Ltd. Crown 8vo., pp. 144, wtih illustrations. Price: 6s. net.

STARLING'S PRINCIPLES OF HUMAN PHYSIOLOGY, Sixth Edition, edited and revised by C. L. Evans, D.Sc., F.R.C.P., F.R.S., and H. Hartridge, M.A., M.D., Sc.D., F.R.S.; 1933. London: J. and A. Churchill. Royal 8vo., pp. 1135, with 562 illustrations, 10 in colour. Price: 24s. net.

SEX EDUCATION IN SCHOOLS: AN EXPERIMENT IN ELEMENTARY INSTRUCTION, by T. F. Tucker and M. Pout, with a foreword by W. Brown, M.A., M.D., D.Sc., F.R.C.P.; 1933. London: Gerald Howe, Limited; Australia: Angus and Robertson, Limited. Crown 8vo., pp. 155. Price: 3s. 6d. net.

SCIENCE AND DEMOCRACY: ADJUSTING THE LAWS OF ADVANCING MECHANIZATION TO THE OBJECTIVES OF CIVILIZED POLICY, by Frank Trinca, M.B., B.S.; 1933. Melbourne: Brown, Prior and Company, Limited. Royal 8vo., pp. 201.

Medical Appointments.

Dr. A. T. Dunlop (B.M.A.) has been appointed a Member and Chairman of the Board of Optometrical Registration, pursuant to the provisions of the *Opticians Act*, 1930-1931, New South Wales.

* * *

Dr. R. W. H. Maffey (B.M.A.) has been appointed Government Medical Officer at Singleton, New South Wales.

* * *

Dr. J. C. Catarinich (B.M.A.) has been appointed Acting Inspector-General of the Insane, pursuant to the provisions of Section 10 of the *Lunacy Act*, 1928, of Victoria.

* * *

Dr. G. A. Wright (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane and Receiving House, Royal Park, pursuant to the provisions of the *Lunacy Act*, 1928, of Victoria.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought etc., see "Advertiser", pages xvi, xvii

CHILDREN'S HOSPITAL, CARLTON, VICTORIA: Medical Officers.

GEELONG AND DISTRICT HOSPITAL, GEELONG, VICTORIA: Junior Resident Medical Officer.

HOBART PUBLIC HOSPITAL, HOBART, TASMANIA: Junior Resident Medical Officers.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.

RENWICK HOSPITAL FOR INFANTS, SUMMER HILL, SYDNEY, NEW SOUTH WALES: Assistant Honorary Dermatologist.

THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND: Resident Medical Officer.

THE PUBLIC SERVICE BOARD, SYDNEY, NEW SOUTH WALES: Senior Medical Officers (male).

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chilliagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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